

COMPUTERWORLD

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The Rules Changed Withholding

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The U.S. Treasury Department has revised its rules for withholding of interest and dividend taxes by financial institutions, the controversial new tax law that has caused monumental headaches for the institutions' DP departments struggling to complete the necessary reprogramming.

Although most of the withholding provisions will go into effect July 1 as previously planned [CW, Jan. 10], the revisions will, among other things, push back the enforcement date six months for certain investment vehicles that are sold at discount, such as U.S. Treasury bills.

Moreover, year-end withholding — as opposed to monthly or more frequent withholding — will be allowed on money market deposit accounts and Super NOW accounts, as well as on savings and checking accounts.

Announcing the revisions March 2, Treasury Secretary Donald T. Regan reiterated the administration's commitment to the withholding provision, which will reportedly yield the government from \$16 billion to \$20 billion over the first five years, monies the administration argues would otherwise go unreported by individuals to the Internal Revenue Service.

The new regulations stem from the 1982 Tax Equity and Fiscal Reform Act.

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Boasts 3.5 Times More Power IBM Finally Unveils 3705 Successor

By Bruce Hoard

CW Staff

RYE BROOK, N.Y. — IBM last week brought out the long-awaited successor to its 3705 front-end processor, the 3725 communication controller, a device that claims twice the internal memory capacity and up to 3.5 times more processing power than its predecessor.

However, the 3725 will not replace but coexist with the 3705 for the near future, one analyst said last week. IBM does not want to upset the 3705 rental base, explained Dixon Doll, president of the DMW Group, Inc. and noted IBM watcher.

IBM is "keeping the price/performance differential modest so that it isn't going to be viewed as an announcement that will instantly obsolete the economic viability of 3705s that are on rental," Doll suggested.

Rumors that the 3705 would be supplanted by a 3725-like product have been rife for well over a year, he added. The 3705, whose current installed base is estimated at 40,000, was introduced in 1972, the 3705 Model-II was unveiled in 1976 and the 3705 Models 81, 82 and 83 in 1981.

The 3725 communication controller announced last week is available in two models which can be intermixed with 3705s in networks based on IBM 370, 30 series and 4300 series processors. The 3725 can coexist in Systems Network Architecture networks with 3705 controllers using current releases of the Advanced Communication Function/Network Control Program.

The 3725 Model 1 can carry data concurrently to six channels and 256

lines. The smaller 3725 Model 2, which can be upgraded to the Model 1, can transmit concurrently to two channels and 24 lines.

Both can be used as remote location controllers (link-attached). Lines and storage may be added without changing existing controller features, IBM claimed.

The 3725 consists of a central con-

trol unit with main storage of 512K bytes, 768K bytes or 1M byte for the Model 1 and 512K bytes for the Model 2.

The purchase price of a Model 1 with 1M byte of storage, four channel adapters, a 3276 expansion unit, console and 121 line interfaces (five high-speed, 116 medium-speed) is

(Continued on Page 4)

Second Personal Computer Focuses on Business Users



The XT Microcomputer Comes With a 10M-Byte Hard Disk.

By Ed Scannell

CW Staff

CAMBRIDGE, Mass. — IBM prepared to cut itself an even larger slice of the microcomputer pie last week when it unwrapped a sequel to its Personal Computer that features a

10M-byte hard disk and the optional capability of communicating with IBM mainframes.

The new microcomputer, christened the XT, costs \$4,995 and is aimed at business users.

The company also announced that it is reducing prices on various configurations of its original Personal Computer by an average of 15%. For example, a 64K-byte configuration with a 160K-byte disk drive and printer now costs \$2,908, down from \$3,305. The same configuration minus the printer lists for \$2,108.

The XT microcomputer is a 16-bit system. Equipped with an asynchronous communications adapter that makes it software-compatible with the Personal Computer, it can also be fitted with optional Synchronous Data Link Control and Binary Synchronous Communications adapters that reportedly permit the system to communicate with the company's entire line of mainframes.

Aside from the 10M-byte hard disk and asynchronous adapter, the XT's basic configuration consists of an Intel Corp. 8088 chip, 128K-byte random-access memory upgradable to 640K bytes, eight expansion slots (three of which are taken up by the

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Magnuson Files for Chapter 11

By Bill Laberis

CW Staff

After losing \$57 million over the last two years, Magnuson Computer Systems, Inc. last week filed for protection under Chapter 11 of the Fed-

eral Bankruptcy Code.

Magnuson will continue to operate under court protection as it attempts to reorganize and pay its debts. Industry observers, meanwhile, are sorting through the evi-

dence to assess whether the mainframer's collapse was the product of nearsighted management or the result of the intense competitive heat of an IBM-dominated marketplace.

By all indications, it was some of each negative force that sent the former Wall Street darling scurrying to protect its now-meager assets, valued at somewhere around \$9 million. The possible demise of Magnuson as an independent company is causing analysts to assess the survival possibilities of the remaining members of the plug-compatible world, which has shrunk dramatically in the past two years.

For Magnuson, the handwriting was on the wall for nearly two years. The maker of IBM 4300-compatible machines blamed its bankruptcy fil-

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M80 Users Not Worried—Now

By Susan Blakeney

And Ed Scannell

CW Staff

While users of Magnuson Computer Systems, Inc. mainframes are concerned about getting spare parts and service for their systems over the long term, many are confident their short-term needs will be met adequately by the vendor and third-party service firms.

Because Magnuson is protected

from its creditors under Chapter 11 of the Federal Bankruptcy Code, the vendor will be able to provide its customer base with service for the time being. Moreover, the company has set up third-party service arrangements in selected U.S. cities with Sorbus, Inc.

One DP manager said last week that he is not worried about Magnuson being under Chapter 11 "because

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COMPUTERWORLD

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Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

OTHER EDITORIAL OFFICES & SALES OFFICES:
New York: Suite 7G, 401 East 80th St., New York, N.Y. 10021. Phone: (212) 570-2135.

West Coast: 257 Lytton Ave., Palo Alto, Calif. 94301. Phone: (415) 328-8064.

Washington, D.C.: 880 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Bill Dunlop, Stephen Thomas, Beere Holson Assoc., 345 Gower Rd., Irlington, London EC1V 3PH. Phone: 01278 3415/6.

W. Germany: Eckhard Uppel, CW Publikationen, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 523330.

France: Patrick Morel, Le Monde Informatique, 42, Avenue Montaigne, 75008 Paris. Phone: 720 85 66.

Japan: Mr. Shobun Kato, Computerworld Japan, 7-4 Shinjima 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882. Telex: 252-4217. Eatehan H. Yamada, Tokyo Representative Corp., Yamaguchi Bldg., 2-12 Kanda Jinbo-Cho, Chiyoda-Ku, Tokyo 100. Phone: (03) 320-4117. Telex: 32660.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest NSW 2065. Phone: (02) 4395133. Telex: SECCO AAZ2468.

Brazil: Eric Hippo, Data News, Computerworld do Brasil, Servicos e Publicacoes Ltda., Rua Alvaro Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 213083RWORD BR.

Mexico: Richard Small, Computerworld de Mexico, Cuauca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (055) 514-4218. (055) 514-6309.

Spain: Neil Kelley, Computerworld Espana, Gavina, 13, Madrid 4. Phone: 231-23-65, 231-23-86, 231-23-88. Telex: c/o IDC 46340 Y Madrid.

Denmark: Preben Engell, Computerworld/Denmark, Ammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. T. ex. 27566 cwden.

Sweden: Bengt Marnstedt, Computerworld/Sweden, Nova Media AB, Vartavagns 58, 11338 Stockholm.

Italy: Daniele Comberi, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

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Software Systems Programming Chiefs Found Highest Paid DP Managers in U.S.

By Paul Gillin
CW Staff

WILLOW GROVE, Pa. — Managers of software systems programming are the highest paid DP managers in North America, according to a recent salary survey of 20 DP positions conducted by the Administrative Management Society (AMS).

The "First Annual Systems and Processing Salaries Report," which covers 63,500 employees in 2,602 companies in 105 North American cities, reveals that systems programming managers earn an average of \$36,100 in the U.S. and \$38,700 (Canadian) in Canada. They are closely followed by applications programming managers, who are paid an average of \$36,000 in the U.S. and \$38,500 (Canadian) in Canada.

In the U.S., managers of computer operations earn the third highest salaries at \$33,100, and data base administrators, lead programmer/analysts and senior software systems programmers also average over \$30,000.

Low Data Entry Salaries

Data entry operators receive the lowest salaries, averaging \$11,800 in the U.S. and \$14,000 (Canadian) in Canada.

Other DP positions in Canada earning over \$30,000 (Canadian) include data base administrators at \$37,300 and lead and senior programmer/analysts and senior software systems programmers.

U.S. SOFTWARE SYSTEMS PROGRAMMING MANAGER

Type of Business	East	East Central	West Central	South	West
Manufacturing/Processing	\$37,700	\$37,400	\$32,900	\$37,500	\$40,300
Banking/Insurance/Financial	\$35,700	\$35,900	\$33,800	\$35,300	\$37,300
Retail/Wholesale Sales and Distribution	\$35,500	\$38,000	\$35,300	\$37,600	\$34,700
Utilities	\$43,300	\$37,800	\$36,000	\$39,200	\$40,300
DP Service Bureau	*	\$37,300	*	\$37,300	*
Government/Education/Employment/Medical	*	\$37,300	*	\$37,300	*

* Not available due to small sample size.

Source: AMS

1982 Average by Region and Type of Business

An AMS spokeswoman said differences between the U.S. and Canadian figures are largely due to the strength of the U.S. dollar. The only major salary discrepancy between the U.S. and Canada is for operations managers, who average \$24,900 in Canada, about \$8,000 less than their U.S. counterparts.

By region, 14 of the 20 positions average the highest salaries in the Rocky Mountain states and westward. By industry, utilities pay best, leading in 19 positions, while the next highest salaries are paid by the manufacturing and processing sector.

The U.S. software systems programming manager working for a utility in the East averages \$43,000, the survey reveals. Regionally, the lowest salaries are in the western Midwest.

Raises are most often awarded on merit, with 82% of the U.S. companies relying on that method. Less than 10% of the companies surveyed based raises on longevity, cost of living or equity.

General increases are awarded twice as much in Canada as in the U.S., with 48% of the Canadian companies surveyed using them for exempt employees.

The 44-page report also includes information on current personnel policies, recruiting practices and training and development programs for DP employees. Statistics are included on company policies on overtime, hours of work, unionization, job rotation and automatic progression. It costs \$90 for non-AMS members, \$60 for AMS members and is available from 2360 Maryland Road, Willow Grove, Pa. 19090.

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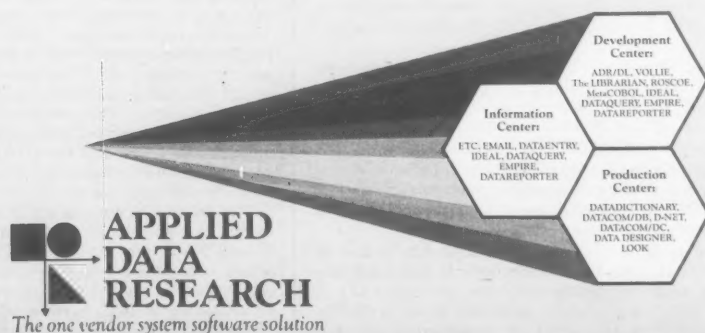
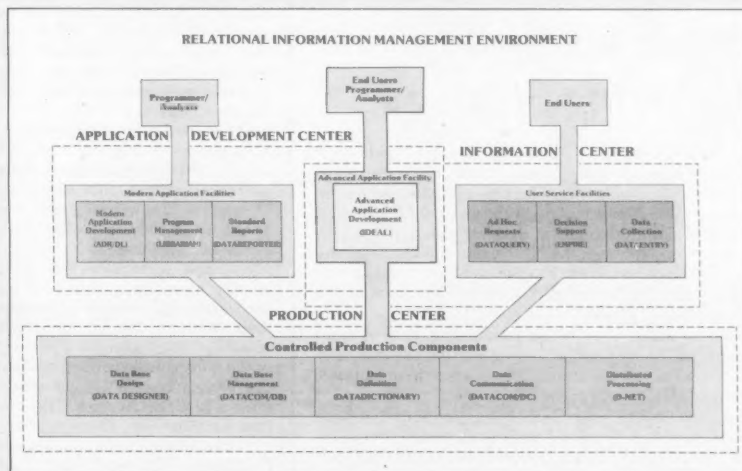
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6/16/83	Indianapolis	6/16/83	4/26/83
Arizona	6/16/83	New Mexico	Dallas
Phoenix	4/19/83	Albuquerque	3/3/83
4/19/83	Iowa	5/17/83	Houston
Arkansas	Des Moines	5/17/83	5/1/83
Little Rock	7/21/83	New York	San Antonio
5/5/83	Kentucky	Albany	4/14/83
5/19/83	Louisville	6/21/83	Waco
California	5/19/83	New York City	6/2/83
Irvine	4/28/83	3/15/83	Utah
Los Angeles	6/28/83	Louisiana	Salt Lake City
3/8/83	New Orleans	5/17/83	5/2/83
San Diego	5/17/83	Syracuse	Virginia
4/21/83	Maryland	6/23/83	Arlington
San Francisco	Baltimore	Westchester	3/16/83
3/10/83	7/7/83	6/30/83	5/31/83
Santa Clara	Massachusetts	North Carolina	Richmond
5/3/83	Boston	Charlotte	6/2/83
Colorado	3/11/83	6/21/83	Washington
Denver	Natick	6/9/83	Seattle
5/10/83	Michigan	6/14/83	6/7/83
Connecticut	Grand Rapids	Cleveland	Wisconsin
Greenwich	8/4/83	4/7/83	Madison
7/12/83	Southfield	Columbus	8/9/83
Hartford	8/2/83	7/14/83	Milwaukee
7/14/83	Minnesota	Dayton	6/23/83
Delaware	Minneapolis	Okahoma	CANADA
Wilmington	8/11/83	Tulsa	British Columbia
8/11/83	Missouri	4/26/83	Vancouver
District of Columbia	Kansas City	5/24/83	2/23/83
Washington	St. Louis	5/26/83	Ontario
3/24/83	Nebraska	Portland	3/29/83
5/31/83	Omaha	Pennsylvania	Toronto
Florida	7/19/83	Harrisburg	5/11/83
Jacksonville	4/12/83	King of Prussia	Quebec
Miami	5/5/83	4/7/83	Montreal
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Big Blue's 3705 Heir Touts Doubled Memory

(Continued from Page 1)
\$299,940. The corresponding monthly rental fee is \$13,155.

According to IBM, a comparable 3705 configuration would require two 3705 Model J4s, each with 512K bytes of storage, at a total cost of \$349,090.

A Model 2 with 24 communications line interfaces, channel adapter and console costs \$85,240 to purchase or \$3,775/mo to rent. A comparable 3705 Model J1-based configuration would cost \$102,035.

The optional 3726 expansion unit increases the total number of communications lines that can be attached to the Model 1 from 96 to 256, depending on the line speeds and traffic factors. The 3727 operator console is a keyboard and display unit

used for installation and maintenance of the 3725.

The maintenance and operator subsystem includes a separate microprocessor, console attachment and a diskette drive for maintenance, record-keeping of machine configurations and logging of machine errors.

The transmission subsystem consists of line attachment bases with integrated communications scanners and line interface couplers. Five types of line interface couplers enable both models of the 3725 to use a variety of line speeds and transmission protocols. Line speeds include 19.2K bit/sec through an RS-232 interface. Protocols include all IBM 3270 models as well as the IBM 2741.

With the optional console switching unit, the primary console for the

Software No Longer Free

RYE BROOK, N.Y. — IBM has begun charging for diagnostic software on its 3725 communications controller, which is available free on the 3705 communications controller.

The software, which has been slightly altered to fit the new controller, includes the Advanced Communication Function/Network Control Program (ACF/NCP), the Emulation Program

(EP) and Advanced Communication Function/System Support Programs (ACF/SSP).

The cost for the software:

- The one-time fee for ACF/NCP is now \$1,080. The monthly fee is \$216.

- The one-time fee for EP is \$1,200 and the monthly fee, \$225.

- The one-time fee for ACF/SSP is now \$420; the monthly fee is \$76.

3725 can be switched to any of up to four controllers. An alternate console is available and can be switched to any of six controllers.

The 3725 Model 1 will be available during the fourth quarter of 1983 and the Model 2 during the first quarter of 1984.

Second IBM Micro Targeted at Business Users

(Continued from Page 1)
asynchronous adapter, diskette and fixed disk adapters), a 5¼-in. dual-sided drive with a 368,640-char. capacity and a detached keyboard.

Available Options

Available options for the 16-bit system, in addition to the SDL and BSC adapters, include a single-sided diskette drive with expansion unit attached, dual-sided diskette drive with expansion unit attached, game adapter, prototype card, user-instal-

lable and replaceable drives and memory and attachment cards, according to an IBM spokesman.

The most surprising feature about the XT, according to a number of IBM watchers contacted last week, is the system's price, which begins at \$4,995.

"I think it shows that IBM can compete on a price basis, which is something a lot of people thought they couldn't do," said International Data Corp. analyst Aaron Goldberg.

"The price is very aggressive and

right now comes close to being the price leader for that kind of configuration," echoed Egil Juliussen, co-founder of Future Computing, Inc. "Over the next month or so you will see a lot of price adjustments from IBM's competitors."

Juliussen also feels the XT will set a standard for those wanting to develop software for Winchester-based micros. "You could buy a Winchester for the [Personal Computer] before this but there were so many different ones and they all had different inter-

faces — you didn't know which was the right one to use. Now it is clear that you go with IBM's because you know there will be upgrades and software for it."

Major Competition

Several analysts feel the XT's major competition will be the hard disk versions of Apple Computer, Inc.'s Apple III, Radio Shack's Models 12 and 16 and Altos Computer Systems, Inc.'s series. While it won't be competing head to head with Apple's hard-disk-based Lisa workstation (due to different price points), International Resources Development, Inc. President Ken Bosomworth feels the XT will be a "diagonal competitor" and may undercut some of that system's market.

Other options introduced for the XT include:

- A 12M-byte memory expansion unit that allows the computer to store up to 22M bytes of data. It costs \$2,695, or \$3,390 when used with the Personal Computer.

- A 12½-in. high-resolution color display monitor capable of displaying 25 80-char. lines as well as graphics in 16 colors. The monitor is priced at \$680.

- An enhanced version of its disk operating system (DOS 2.0) that contains a Basic interpreter. The system lists for \$60.

- A word processing package from Peachtree Software, Inc. called Peachtext, which features a series of Help menus to aid in problem solving. List price for the package is \$400.

- Additional versions (1.1) of Peachtree-developed business packages including general ledger, accounts receivable, accounts payable, inventory control and payroll. The 1.0 versions of these packages can be upgraded to 1.1 models for \$120 per package through IBM product centers, the spokesman said.

The XT and its options are immediately available in all IBM product centers throughout the U.S. and Canada, a spokesman said. The system comes with a 90-day limited warranty, according to IBM. Further information is available from IBM's System Products Division, which can be reached through P.O. Box 1328, Boca Raton, Fla. 33432.

Analysts Say Introduction of XT Confirms Shift in Marketing Strategy

By Ed Scannell
CW Staff

IBM is making a major shift in its marketing and technological strategies, refocusing the lion's share of its attention on the lower end of its systems spectrum.

That is the theory of a number of analysts contacted last week after IBM's introduction of its XT Personal Computer and the announcement of its 3270 Personal Computer, which allows its mainframe-linked 3278 terminals to run the same programs as the IBM Personal Computer. This shift in strategy was attributed in part to the phenomenal success of the Personal Computer, which has forced the company to center its low-end strategy more around its microcomputer products and less around its 3270 series.

Proponents of this theory document their claim by pointing to the XT's asynchronous communications adapter and Synchronous Data Link Control protocol adapter, which permit it to communicate with IBM's complete line of mainframes. They claim the microcomputer line, once considered a technological outcast, is being brought closer to the IBM family.

Personal Computer Attaining Dominant Position

"The important change in IBM's plans, at least as we understood them six months ago, is that the [Personal Computer] line appears to be attaining a dominant position in their thinking vis-a-vis the 3270 line," asserted Kenneth Bosomworth, president of International Resources Development, Inc.

"The [Personal Computer] at one stage, as recently as a year ago, was perceived within IBM as an orphan product, a product that was out there on its own with an operating system that was not related to anything that was going on with any mainframe," Bosomworth noted. But with the new communications protocols, the microcomputer line is now becoming a "central element of [IBM's] whole network architecture strate-

gy," the International Resources president said.

According to Bosomworth, IBM appears to have abandoned an ambitious program, code-named Rover, that was intended to upgrade the entire 3270 series. It was IBM's intention to lead its customers to its personal computers through the 3270 series, but the company now seems to be taking the opposite tack, Bosomworth said, describing last week's 3270 introductions as the "premature offspring of the Rover program."

He contends that IBM's purchasing 12% of Intel Corp. last October was an indication that the company is becoming more committed to its microcomputer line.

Aaron Goldberg, an analyst for International Data Corp., strongly disagreed with Bosomworth's contention that IBM is putting less emphasis on its 3270 terminals. The XT announcement did not represent "a shifting of IBM's strategy. This is providing the user with options," Goldberg said. "There are two different needs to be met. Both machines do different jobs better."

By fitting the XT with mainframe adapters and communications protocols, it is not getting special treatment among IBM's low-end systems, he maintained, pointing out that IBM has done the same thing for its Displaywriter, 5280 and 5520 systems.

Moreover, in a predominantly mainframe environment such as IBM's, a microcomputer has to run fast and efficient protocols, something microcomputers are simply not capable of doing, he added.

"The personal computers are intended to be used as a single-task, single-user computer that does local processing with application software. You can make it into a 3270, but that is not its natural mode. A 3270 is designed to be an on-line or time-sharing terminal communicating with a large mainframe," Goldberg explained.

IBM Brings Out Additions, Enhancements for 3270 Line

By Bruce Hoard

CW Staff

RYE BROOK, N.Y. — Last week's blitz of new products from IBM included the 3178 CRT terminal, which costs almost \$1,000 less than the 3278 Model 2 and incorporates its most popular features. An attachment that lets the 3278 operate as an IBM Personal Computer was also announced. In addition, the vendor introduced four new models of the 3274 control unit, the Model 3299 terminal multiplexer and the Model 3290 gas panel display station.

The 3178 consists of a 1,920-char., 12-in., nonglare CRT screen that can swivel 90 degrees left or right; a lightweight, low-profile keyboard that can be adjusted to a 6- or 12-degree slope; and a logic element with a pedestal that serves as the unit's base.

The 3178 is said to be the first IBM product offered with a five-year maintenance option. Prices begin at \$1,660, \$988 less than the 3278 Model 2. The terminals will be available within 30 days.

The 3270 Personal Computer attachment allows a 3278 user to continue to utilize the capabilities of IBM's medium-size and large computers, as well as those of the Personal Computer. The operator can easily switch from interacting with applications in the central computer to working locally with Personal Computer functions.

Two-Component Attachment

The attachment consists of two components. The first is the 3278 Personal Computer adapter, which is installed at the customer location by an IBM service representative, and the second is the Personal Computer 3278 attachment option, which is installed by the user.

To use the two-component attachment feature, the system unit of the IBM Personal Computer is required. Three new system units ranging in price from \$1,594 to \$2,363 were also announced. If a user already has an IBM Personal Computer, he need only acquire the attachment feature — which costs \$1,700 — and add it to the 3278.

The 3278 with adapter can communicate via the 3274/76 control unit to any host supporting 3278s. Adapter shipments begin in May.

The four new 3274 controllers are said to offer new price and performance and improved support for both local and dispersed networks handling different applications concurrently.

The following devices can be attached to the 3274s: Model 3178 and 3278 CRT terminals; Model 3279 color CRT terminals; the 3290 information panel; Model 3287, 3262 and 3268 printers; and the 3299 terminal multiplexer.

The controllers range in price from \$7,600 to \$18,230. They will rent for \$382 to \$946/mo. Two-year lease charges will be \$326 to \$806/mo.

The IBM 3299 terminal multiplexer can be connected to the 3274 controller via a single cable and supports up to eight terminals via shorter ca-

bles that fan out from the 3299 to each device. It also doubles to two miles the distance allowed between the control unit and the terminal.

The 3299 costs \$1,175 and will be available within 30 days.

The IBM 3290 information panel uses a flat gas panel to display up to 9,920 characters of data on a distortion-free screen that is 10.7 by 13.4 inches. It attaches to IBM 370, 30 series and 4300 series computers and to the 8100 information system via a 3274 control unit.

The purchase price for the 3290 is \$7,100 and the monthly rental fee is \$315. A variety of maintenance agreements is offered.



The IBM 3178 is a compact, lightweight CRT terminal.



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Wants to Distribute Capabilities N.H. Governor Trying to Abolish Central DP

By Jim Bartimo
CW Staff

CONCORD, N.H. — If newly elected Gov. John H. Sununu's fiscal 1984 budget is approved by the legislature, this state's DP staff will have a long, hot 60 days of summer to dismantle its DP facility — and then staffers may be out of work. The governor wants to distribute DP capabilities to individual state departments starting in July.

Depending on who is asked, the reasons cited for the breakup of the centralized DP facility range from budgetary to political (see story right).

The 105 employees of New Hampshire's Centralized Data Processing (CDP) organization are responsible for most of the state's financial data processing, including that of the Welfare Department, the Registry of Motor Vehicles and the state's equivalent of the Office of Management and Budget. But because CDP is an agency under the direction of a state commission, it can be written out of the budget with relative ease.

And "in the present budget, the line item for CDP is zero dollars," William Herman, the governor's press secretary, said last week. "The governor has made two initiatives, one to cut the budget and one to cut government bureaucracy."

Believing that CDP is part of that bureaucracy, the governor plans to allow the individual departments to run their own DP facilities. Hardware, personnel and autonomy will go to those departments that need it, and the remaining departments will latch onto the larger autonomous DP facilities.

B2900 Gets Upgrade Path As Burroughs Adds B2925

DETROIT — Burroughs Corp. provided its B2900 users with an upgrade path last week by adding an entry-level mid-range system the company claims is 1.3 times faster than its predecessor, the B2800, and takes up 60% less space.

Dubbed the B2925, the system's CPU holds a minimum of 1M byte and a maximum of 2M bytes of memory. It is software-compatible with all of Burroughs B2000, B3000 and B4000 mid-range processors, a Burroughs spokesman said.

The basic system consists of an I/O processor, an integrated console subsystem and up to eight data link processors, according to the Burroughs spokesman.

The system can be upgraded to have up to 16 data link processors by adding a second data link processor base, the spokesman said. The system's data communications capabilities can also be enhanced by incorporating the vendor's B3680 communications processor, which accommodates up to four host computers and 288 data communications lines.

Another option for the system is the Shared System Processor, which is part of the I/O subsystem and per-

Proposal Both Praised, Damned

CONCORD, N.H. — The move by newly elected Gov. Sununu to abolish the state's Centralized Data Processing (CDP) facility was both praised and damned by CDP users who would go on record last week.

Those who would not go on record, however, claimed that CDP is the victim of a movement launched by its end users.

According to sources, CDP had long been the target of resentment from its users. "For a number of years, there was a feeling that all the computer knowledge was held by the great gurus of CDP," said one state official. "And you'd have to pay them double what it would cost to do it yourself."

Another complaint was that CDP spends too much time on maintenance.

Although these feelings have abated somewhat in the 18 months since CDP Director William Finch

took over, another user said that the movement to dethrone CDP started with a recent independent consultant's study. "The consultant asked all of the user departments what they thought of CDP, and they were all critical," the state official said. "If some of those departments knew what would be proposed to replace it, they wouldn't have been so harsh."

One Satisfied User

One user who went on record praised CDP and Finch, blaming other departments' unhappiness on their inability to deal with a service organization. "I, for one, am happy with CDP," declared Charles L. Connor, deputy legislative budget assistant in the Division of Budget and Fiscal Support for the N.H. legislature. "If you're going to work with an agency such as CDP, you have to know what you want and be willing to

work with them."

Connor is somewhat fearful of what decentralization will bring to his department, which is "New Hampshire's version of the [federal] Office of Management and Budget and the Government Accounting Office," Connor said. "My department has no technical staff to program or analyze any of that stuff. We know we want reports but we don't want to do it ourselves."

In contrast, the Department of Safety, which handles the state police and the registry of motor vehicles, welcomes an autonomous DP arrangement. With five major files on different systems, "we're all over the place," Mitchell Call, DP project manager, said. "We have a tremendous amount of file redundancy. We have to integrate the files into a data base management system, and CDP can't handle that for us."

Although Herman said "we want to distribute [the CDP resources] and fill in where it's needed," Director of CDP William Finch pointed out that 27 departments already have some DP equipment.

"Many people took advantage of the confusion over word processing and data processing," Finch said. "A lot of data processing machines came in with word processing coats on," according to Finch.

Finch argued that even if a reorga-

nization is necessary, a 60-day period is too short a time for such a project. "If there's a plan," he said, "I'm not in on it right now."

There are other concerns for the DP chief, one of which is the lack of telecommunications among various departments. Herman said communications is unnecessary because departments with related activities will share the same DP facility.

But Finch said he believes that confusion will spring from a distributed environment with different types of equipment. "We provide communications facilities for all the departments," Finch said. "We use an IBM 4300 for communications. With all the communication that's going on now, you need a traffic cop."

Another concern is whether CDP staff members will be reassigned or fired if the budget is passed. "We're already picking up resignations from key people," Finch said. "High-tech people don't need this kind of trauma."

The governor's budget containing

the CDP cut has met with favorable response from the legislature and could be approved as early as May 1, according to Herman. But a number of legislative processes are still to come, including testimony from CDP personnel.

Sununu is drawing on his experience in business to reorganize the system, Herman said. "The governor has been a consultant in business. He has contacted computer consultants, and they agree there should be a change."

The governor expects that cost justification for the retooling of an entire state's DP system will not come right away, but "in the long run, it will be a cost-saving measure," Herman said.

Whatever happens, Finch maintained, "I'm not fighting with the governor. I've shared my feelings with the governor and he has listened."

"My job is to work with the governor. If they decide what they want to do — we'll help them," he concluded.

Withholding Rules Revised

(Continued from Page 1)

responsibility Act. Elderly and poor taxpayers will be exempt, but most others will have 10% withheld from interest and dividend payments from financial institutions.

Implementation of the 1982 tax act's "withholding at the source" provision had been delayed once before, but banks and other financial institutions claim that the withholding changes eventually will cost millions of dollars for reprogramming and for new bookkeeping requirements.

A massive lobbying campaign orchestrated by the institutions and their trade associations has resulted in more than a million cards and letters from depositors to their Con-

gressional representatives.

Legislation to repeal the withholding provision has overwhelming support of the majority in both houses of Congress. However, congressional leaders and the White House strongly oppose repeal, leaving the outlook for such bills uncertain at this time.

Treasury's Regan said the withholding revisions announced early this month respond to the legitimate complaints of financial institutions that responded to a request for public comment on the new tax law. The various revisions are designed to relieve the institutions from "undue hardships" that might have resulted from implementing the withholding tax this summer.

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Magnuson Files for Chapter 11 Protection

(Continued from Page 1)

ing in part on the steep 4300 price cuts that IBM made last October.

But analysts feel the die had been cast long before. "The company got pigeonholed in a market that just didn't grow as extensively or as fast as people first thought," said Dale Kutnick, director of research at The Yankee Group in Boston.

Kutnick said selling 4300-compatible mainframes is a very expensive, time-consuming proposition, mainly because users are often reluctant to leave the IBM fold to save "maybe \$30,000 or \$40,000, which is all they'd save on a small plug-compatible mainframe."

In addition, management shortcomings at Magnuson resulted in its becoming largely a one-product firm, Kutnick indicated.

"They tried to expand all at once with no real sense of direction," Kutnick continued. "They lost a lot of credibility about two years ago, especially when Carl Amdahl [former executive vice-president] left. They were just too thin all around."

Another theory is that Magnuson missed its marketing chance. "Fundamentally, I think [Magnuson] missed the window they had when they first came out with the product. They had a lead on IBM of 18 to 24 months, depending on who's counting the months, and when they ran into trouble a couple of years ago and had to suspend their development activity they lost their window," said Joe Oddo, staff vice-president of Automatic Data Processing, Inc. (ADP) of Clifton, N.J., Magnuson's biggest user.

"If you look at the 4300 family of products — and the breadth of horsepower it covers — you wonder where [Magnuson's] niche could possibly be," he added.

Jack Hart, industry analyst at International Data Corp. in Framingham, Mass., indicated that Magnuson's management can be directly blamed for the company's downfall and IBM only indirectly. The firm's management, Hart said, "should have known they were getting into an IBM world — there was no excuse

for going in blind."

Hart said that plug-compatible vendors benefited for several years from IBM's nonaggressive price structure, which allowed IBM's competitors to undercut the industry giant by 10% or more and still profit.

Since the dismissal of the U.S. vs. IBM antitrust suit, however, IBM has announced a series of strategic price cuts that has ravaged its plug-compatible competitors. As Hart put it, "The [plug-compatible manufacturers] were cozy beneath the IBM price umbrella, which now is collapsing all around them."

Hart, too, noted that Magnuson's problems began at least a year before IBM initiated its more aggressive pricing policies. In 1981, the company began experiencing extensive field problems with its M80 line of processors, problems that required extensive reworking in the field. It was in March of 1981 that Carl Amdahl left Magnuson's research and development team. Magnuson also scrapped a costly Cmos development effort that year when plans for an R&D development effort in that technology fell through.

By the end of that year, Magnuson was reporting a \$36 million loss on revenues of only \$27 million.

Merger Partner Search Begins

Company fortunes continued to slide in 1982 and the search for a merger or acquisition partner began. A likely candidate emerged in Storage Technology Corp., but unsettling news about Magnuson's debt killed the deal. Magnuson President Joseph Hitt resigned under pressure and the firm initiated the first of several layoffs.

Finally, last November, a group of private investors purchased a controlling interest in Magnuson. But the dam had already burst. Magnuson finished 1982 losing \$21.6 million and began 1983 by announcing it was scrapping development plans for its next line of processors.

In a prepared statement issued last week, Magnuson President Charles Strauch said merger talks had been started with two companies but de-

clined to name them.

Speculation is that any one of the large, IBM-based service bureaus could be interested in buying Magnuson, perhaps to supply their customers with small mainframes to perform distributed data processing. One such company mentioned is ADP, which uses more than 90 M80s.

A spokesman for ADP, however, said the company has no plans whatsoever to buy Magnuson. Most of ADP's machines are leased, he noted.

The Yankee Group's Kutnick said the purchase price of Magnuson at

this time would be in the \$20 million to \$30 million range. "If there's anything really left there to acquire, it would be an interesting and cheap acquisition," he added.

Meanwhile, analyst Bill Easterbrook of Kidder, Peabody & Co.'s Technology Research Group in New York is skeptical that Magnuson will survive Chapter 11.

"Chapter 11 is a serious thing. If I owned a Magnuson system, I would certainly want to find someone to take care of it two to three years down the pike," Easterbrook said.

Users Not Worried — Now

(Continued from Page 1)

over the past 3½ years the company has proved they have good equipment." Dick McTague of United Farm Real Estate in Kansas City, Mo., said that "this indicates to me there are companies that would recognize the value of the customer base and the equipment and would be more than willing to assume [Magnuson's] maintenance responsibilities." McTague's firm owns the first M80/43 installed in Kansas City.

The biggest concerns for Lee Fitzpatrick, director of hardware and communications at Computer Sciences Corp. (CSC) in Los Angeles, are the availability of spare parts for his Magnuson shop and the small number of service companies available for his equipment. "My personal feeling is that there is enough expertise in the country so I don't think we'll have a problem," he said.

CSC has six Magnuson machines — three M80/31s and one each of the M80/30, M80/42 and M80/43. Fitzpatrick's only fear is that parts and service costs for his equipment will escalate if Magnuson goes under.

Magnuson's largest user, Automatic Data Processing, Inc. (ADP) of Clifton, N.J., has been making contingency plans since the vendor filed under Chapter 11. "We have put procedures in place to cover ourselves," confided Joe Oddo, staff vice-president at ADP. "We have relationships with a number of companies that

make us feel confident we can get the level of support we need, at least for the intermediate period.

"Longer term — if they can't pull out of it — it's hard to imagine continued viable use of the equipment." All of ADP's Magnuson equipment, which includes 30 Magnuson-made machines as well as 60 other IBM-compatible mainframes, is leased, so Oddo is not worried about losing a major investment if the vendor folds. Were Magnuson's users surprised at the vendor's Chapter 11 filing? Most of those contacted last week admitted they had sniffed trouble long before the March 8 announcement.

"If you have followed the history over the past year, you well know they have been having financial problems... their quarterly earnings have not been good, so there were indications that it was inevitable that this was going to happen," McTague said.

Oddo concurred: "When you work closely with a vendor and observe his progress on a monthly basis... you begin to ascertain where he is headed before he announces anything. It has been common knowledge they have been in trouble for a long time."

"I think we all knew it was coming sooner or later," Fitzpatrick added. "If somebody didn't buy them out, [we knew] they would end up in this situation. It still doesn't mean someone won't pick up the pieces."

It Will Be Service as Usual, Magnuson Exec Promises

By Robert Batt

CW West Coast Bureau

SAN JOSE, Calif. — Users of Magnuson Computer Systems, Inc. processors can expect service as usual during the company's Chapter 11 bankruptcy proceedings, its vice-president of operations has promised.

Interviewed here last week, Robert Stephens voiced optimism about the company's chances of surviving Chapter 11: "The company can definitely survive, based on customer confidence and our ability to continue with support services. Our job is to honor our contractual obligations to our customers, and this we intend to do."

Stephens' optimistic assessment of Magnuson's situ-

ation is, he explained, based on the fact that users have remained loyal to Magnuson over the past year despite the company's financial troubles. Customers have had plenty of opportunity to switch to equipment from IBM or to other plug-compatible manufacturers' equipment, he argued, but have not done so.

In fact, Stephens claimed, the number of users in the past year rose to over 300.

Stephens, the Magnuson executive who has been chiefly responsible for renegotiating the company's outstanding debt, said the company will focus in the immediate future on financial restructuring, building new business relationships and diversifying.

"We are being very realistic about the immediate future," he said. "For the moment, we are focusing on the next 90 days, and we intend to base our plans on short-term increments... We do not see Chapter 11 as a desperate move. Rather, it is a thoughtful business response to the situation."

Stephens agreed the company could have filed for court protection under the bankruptcy code earlier. However, Magnuson wanted to do everything it could to avoid that step.

"The risk in filing for Chapter 11 protection is that there will be a loss of customer or employee confidence or that we are unable to reorganize successfully while under the protection

of the court. The advantage, on the other hand, is that we can gain control over our destiny."

"The problems we are facing are manageable," he asserted.

Prompted by IBM

Stephens reiterated the claim made by Magnuson Chief Executive Charles Strauch that IBM's recent market aggressiveness coupled with a shareholder class action against the company claiming nondisclosure of financial information had prompted the latest action.

Stephens admitted that the suit, which the company claimed is unfounded, had been a major barrier to obtaining substantive relationships with other companies.

It diluted the company's energies, which needed to be focused on financial viability and competition with IBM, he said.

Moreover, legal costs have been high, and "to compete with IBM, you need to have money." While Magnuson has restructured \$7 million of its debt to major creditors since November, it is left with \$6.8 million of unsecured debt.

Over the past four months, Stephens said, Magnuson pursued the possibility of building OEM relationships, diversifying into areas outside of the mid-size mainframe market and marketing DP products for other companies. "All these turned out to be an exercise in frustration," he reported.

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Program Differences Reflect Issues

RPI, BU Announce Master's in MIS Programs

By Lois Paul
CW Staff

In the midst of the continuing clamor for and controversy about master's degree programs in management information systems (MIS), two schools recently announced that they are beginning M.S./MIS programs.

In June, 20 students will enter Rensselaer Polytechnic Institute's (RPI) Management of Technology for Technical Professionals program. And in September, Boston University (BU) will admit the first 40 students to its M.S./MIS program.

But there are differences in the curricula and targeted student bodies

for these two programs, and these differences highlight some of the issues involved in the whole area of graduate MIS education. Among them is the issue of whether to emphasize the more technical aspects of computer science or stress the management issues that usually are more typical of an MBA program.

Another issue is whether to concentrate on training students with business backgrounds in technical subject areas or whether to provide technically oriented students with an understanding of business.

BU is trying to position its program in the middle, with a slight leaning toward management. The 12-course program, which can be completed in three full-time semesters, is "aimed at applying information systems to manage business problems," and entrants are required to possess an undergraduate degree in business, according to Associate Dean Michael E. Lawson.

The program's three levels of courses will include an applications area consisting of a review of major MIS applications, a technical core designed to provide both practical skills and a theoretical framework and elective MIS courses intended to provide additional depth in important aspects of the technology.



CW Photo by P. Gilin

BU's program is 'aimed at applying information systems to manage business problems,' said Associate Dean Michael E. Lawson.

Initially, the program will accept 40 full-time students. Lawson said it is deliberately being kept small because of the difficulty of finding MIS professors. However, BU already has seven or eight full-time faculty members for the program and is actively recruiting additional faculty.

While BU's program is geared toward launching business undergrad-

uates into careers as MIS managers, RPI's program is intended to help technically oriented people who are approaching the management level obtain the business training they need to make this leap.

"Most of the successful engineers in the sciences obviously assume managerial positions," Robert J. Allio, dean of the School of Management at RPI, said. "Very few of them, in the process of assuming the managerial role, had any formal preparation."

RPI's program requires eight weeks of full-time classes for three summers. Between summer sessions, the students will work under the direction of faculty members to apply to particular corporate issues what they have learned during the past semester.

"If you take a year off from your job, you might as well forget going back to that position or a related position. There is just no way of maintaining the continuity within the corporation for a 12-month or even a six-month period," Allio said.

The BU program also includes an internship program during which students will spend 10 hours a week working in groups of four at local corporations to help them design and implement information systems.

Students Urged To Compare MIS Programs

How does a prospective student distinguish among the variety of graduate management information systems (MIS) programs that are springing up in increasing numbers?

Every program is slightly different, noted Lynn DeNoia, assistant professor and coordinator of the M.S. in Computer Information Systems (CIS) program at Bentley College in Waltham, Mass.

"The key for me between Boston University and Bentley, for example, is that [Boston University's] graduate program is an MIS program and ours is CIS. And although we tend to try to focus on producing people who are appropriate liaisons between management and technical types, they really are going to focus much more on the management side."

The University of Minnesota established an M.S. in MIS program in 1968. "We took the tack that there is a need for a person who can span management and the information systems area," explained Gordon Davis, Honeywell professor of management information systems at the school. He noted that the program has been broadened so that its graduates receive an MBA as part of it.

Davis compared the University of Minnesota's program to Boston University's, but noted that the latter "strips away some of the things that you might expect in an MBA program to keep it short. They are saying that you have an undergraduate business degree. On top of that we will put MIS."

There are similar programs at New York University, University of California at Los Angeles, Northwestern and University of Arizona at Tucson, and these types of programs, Davis said, "provide that mixture of the technical and the organizational and management so a person can design information systems to suit organizational purposes and implement them and manage them."

Certain technical areas, such as programming and development methodologies, are better learned on the job, he said, so long as the concepts are understood via the graduate program.

Directory, Survey Offer MIS Program Info

There are a number of graduate management information systems (MIS) programs, but few centralized sources of comparative information about them. However, the University of Minnesota last December released the "MIS Research Center/McGraw Hill 1983 Directory of Management Information Systems and Faculty," which lists 135 schools offering MIS programs in the U.S. and Canada and their faculty members.

Of the 135, about 100 are offering MIS programs on the graduate level, according to Gordon Davis, Honeywell professor of management information systems at the University of Minnesota.

Copies of the directory can be obtained for \$10 from the University of Minnesota MIS Research Center, 269 19th Ave. S., University of Minnesota,

Minneapolis, Minn. 55455.

Gordon himself participated in an earlier effort to survey the number of schools offering MIS programs. The survey was conducted in 1979 by the Association for Computing Machinery (ACM), and its results were published in the March 1981 *Communications of the ACM*.

Jay Nunamaker, head of the MIS department of the University of Arizona in Tucson, Ariz., and chairman of the curriculum committee on information systems for ACM, explained the workings of the survey: "People sent in information on their curriculum and we sorted through it to see if it met some minimal set of guidelines from ACM. The criteria was that it had to have five courses that dealt in the area of programming systems, data and file struc-

tures, systems analysis and design. If there was some set of five courses that roughly fell in those categories, plus four courses that address the functional areas in business, then that was the minimal set that we were looking for."

Of the 70 programs identified at the bachelor's level, 53 satisfied this minimal set of criteria. At the master's level, 54 programs were identified and 34 satisfied the ACM guidelines.

ACM has not updated its survey. Gordon speculated that there may be 20% more graduate MIS programs to date that meet the ACM's criteria.

Further information on the ACM survey can be obtained from the Education Board of the Association for Computing Machinery, 11 W. 42nd St., New York, N.Y. 10036.

Beware of Weak Programs, Prof Warns

A word of caution for prospective graduate management information systems (MIS) students was issued by J. Daniel Couger, professor of computer and management science at the University of Colorado's College of Business and Administration in Colorado Springs, Colo.

While Couger thinks "all the market trends point to the fact that we are not nearly meeting the demand... there are some terrible programs out there," he warned last week. "There are some programs that offer a couple or three courses and call it an MIS program, as opposed to trying to implement the [Association for Computing Machinery (ACM)] curriculum."

Couger alluded to a weakness in the background of students with strong computer science education but no business courses and few humanities. They do very well in programming, he said, but after two years they hit the top of their level, not knowing enough about

the business aspects to qualify to be systems analysts. "Nor have they had the managerial courses to qualify them to lead a division," he added.

Alternatively, students in schools of business that have very weak quantitative requirements "graduate having systems courses and managerial courses, but are not able to work at all with complicated systems," Couger said, noting that they would not be capable of working with complex applications like a data base.

Couger, who worked on the ACM's curriculum guidelines for graduate MIS programs, also expressed concern about the potential increase in graduate MIS programs without the accompanying qualified faculty members. There are 18 teaching positions for each Ph.D. candidate in MIS, he said, and many schools are attempting to start graduate MIS programs with one or two faculty members and an overreliance on part-time faculty.

Schools Disturbed by Corporate-Faculty Ties

By Tom Henkel
CW Staff

Several universities are concerned that faculty members — particularly those involved with computer science, electrical engineering and bio-engineering — are establishing such strong ties with corporations that they can no longer objectively function as university researchers.

Universities are also concerned that professors are letting their corporate consulting work interfere with their teaching duties. In addition, some university officials question whether faculty members are misusing university resources (particularly computer systems and graduate students) to carry on research for corporations.

The University of California system has instituted 20 different policies during the past five years to govern the types of dealings that faculty members can have with outside organizations. The latest one is a state-mandated program that requires faculty leaders of nongovernment-supported research projects to disclose any financial ties with the sponsor of that project.

Nongovernment research projects are sponsored by companies in the private sector, as well as foundations and public agencies like the American Cancer Society, American Heart Association and American Lung Association, which receive funds from corporations.

Suspect Integrity

Some professors receive pay for their research, but there are also other financial ties with corporations. For example, a faculty member can serve on a corporation's board of directors, be a corporate officer or own a large amount of stock in a particular company. In the eyes of many universities, this type of involvement makes the integrity of research done under the sponsorship of a corporation somewhat suspect.

According to Afton E. Crooks, conflict of interest specialist for the university system, as of the end of January, 126 project leaders out of 1,210 (about 10.4%) had direct financial ties with the sponsors of the nongovernment-funded research projects they headed. Crooks said the university system's board of regents has yet to determine how many of those project leaders are involved in

electronics research.

"We're not sure whether that [number] is high or not," Crooks said, noting that only in the past six months has the university required project leaders to tell whether they had dealings with sponsors of their research projects.

"We're thinking about this whole field very deeply," Crooks said. Aside from the state-mandated project disclosure program, the university system requires all its faculty members to tell the university when they are doing consulting or other research work outside the university. Currently, faculty members are required to tell the university the name of the firm and offer a description of the work they are doing. At this point, however, the university does not require faculty members to disclose how much they are being paid for their services.

Traditional Watchdog

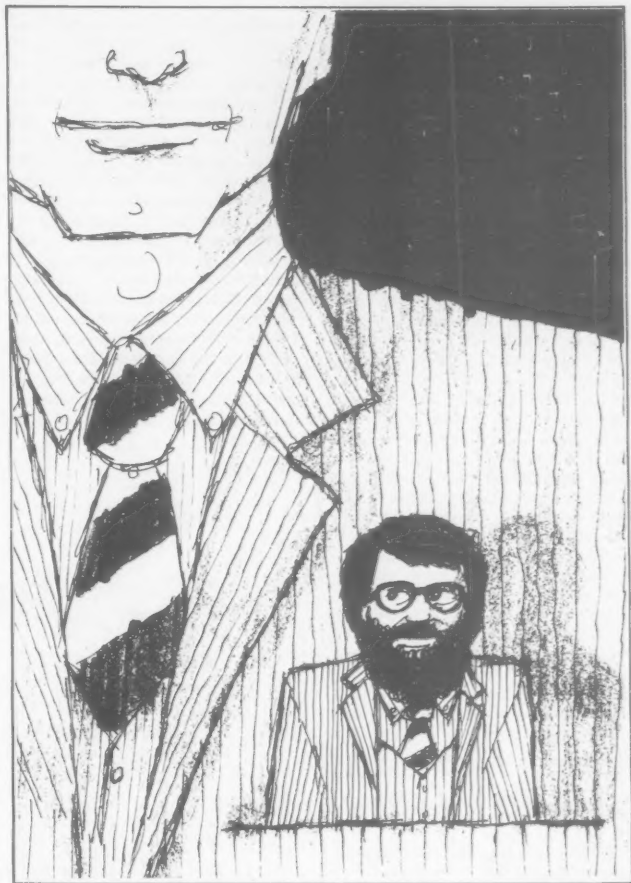
Traditionally, Crooks said, it has been the job of department heads to keep an eye on professors and determine whether they are spending too much time on outside interests.

The disclosure requirement has received a mixed reaction from faculty members, Crooks said. Some contend that the requirement is a violation of their privacy. Others feel the requirement will preserve the integrity of the university.

"The policy is a big pain," said one faculty member who does financial consulting. "You just have to fill out more forms. I tend just to ignore them."

University officials generally agree that faculty involvement with corporations is not necessarily evil. Prof. Clement Markert, chairman of a Yale University committee that recently recommended that faculty members be required to file disclosure forms, noted that consulting work and corporate research helps keep faculty members abreast of current developments in their respective fields. That corporate involvement becomes a problem when faculty members spend too much of their time working on outside projects.

At MIT, where a majority of the computer science, electrical and bio-engineering faculty members have ties with at least one corporation, the university requires that virtually all



CW Illustration by T. Monahan

corporate-sponsored projects have public results. Sponsors of most MIT research projects:

- Must permit the findings of the research to be made public and be available for publication.
- Must give MIT sole possession of any patents or copyrights to products that may result from a research project.
- Must allow MIT to retain the freedom to issue rights to any patents or copyrights to the corporate sector on a nonexclusive basis.

An MIT spokesman said that while there have been some occasional exceptions to that 100-year-old policy, faculty members who fail to

comply generally face immediate dismissal. However, MIT is slightly more flexible on the types of corporate positions its faculty members can hold. For example, some faculty members have served as directors of corporations, provided that position does not detract from the faculty members' teaching responsibilities.

Pittsburgh's Carnegie-Mellon University (CMU) is very dependent on corporate-funded research, noted its provost for science and engineering, Dr. Daniel Berg.

According to Berg, CMU ranks third highest among technical schools doing corporate-sponsored research.

However, the school has yet to develop a formal policy on conflicts of interest. Berg heads up a faculty committee that hopes to develop a conflict of interest policy sometime this spring.

"We are a relatively small and open place," Berg noted, adding that CMU's size makes it difficult for faculty members to keep secrets.

In Palo Alto, Calif., Stanford University requires faculty members to disclose corporate connections on request if there is some question of conflict of interest. In addition, the university routinely surveys faculty members on their corporate affiliations.

A Stanford spokesman said that while the university is aware that more faculty members are doing corporate work, there are no immediate plans to alter university policy.

Reagan Endorses High-Tech Enterprise

SAN FRANCISCO — President Reagan took time during his recent trip to the West Coast to deliver a ringing endorsement of free trade principles and to reiterate his newfound admiration for U.S. high-technology industries.

In a March 4 address here, Reagan strongly denounced what he called "those faint hearts who have little faith in American enterprise and ingenuity" and praised the entrepreneurial spirit of the high-tech industries located in nearby Silicon Valley.

Reagan singled out Daisy Systems Corp. of Sunnyvale, Calif. The 2½-year-old maker of computer-aided design systems increased its revenues from \$7 million the first year to

a projected \$25 million in 1983, with 1986 revenues expected to reach \$300 million, Reagan noted. Exporting to seven foreign nations, the firm has quadrupled its work force in the last year, the president said.

Reagan discussed his administration's efforts "to retain America's technological edge" by, among other things, supporting research and development tax credits and increasing federal support for basic R&D.

"For too long," Reagan said, "the government has treated the entrepreneur more as an enemy than an ally. Our administration has a better idea. We'll give you less bureaucracy if you give America your audacity."

The president briefly outlined his

administration's three-point plan for supporting U.S. industrial competitiveness in world markets. The plan calls for laying "a firm foundation for noninflationary growth"; working with U.S. industry to enhance its competitiveness, especially through negotiated reduction of international trade barriers; and helping "international financial and trade institutions to strengthen world growth and bolster the forces of freedom and democracy."

The U.S., Reagan said, "will stand up for principles of trade expansion through freer markets and greater competition among nations... [and] carry the banner for free trade and responsible financial systems."

Communications Execs Offer Peep Into Future

By Phil Hirsch

CW Washington Bureau

BALTIMORE — Predictions about forthcoming data communications technology were the order of the day at a financial analysts' conference convened here last week by Alex Brown & Sons.

MCI Communications Corp.'s Bill McGowan said that MCI is now installing a modulation system that will allow twice as many bits to be transmitted per unit of time through its backbone microwave network. The first commercial use of the quadrature amplitude modulation system is scheduled for this fall between New York and Chicago, a company spokesman added.

The MCI chairman also reported that beginning in September 1984, customers of the divested Bell operating companies who want to route their long-distance calls over other common carrier facilities will be able to do so either by telling the Bell operating companies ahead of time — and thus having all calls automatically transported to the other common carriers' local switch — or by entering a four-digit code as part of the call setup process. Customers who want to use AT&T's Long Lines Division will also have to employ these procedures, he said.

At the same meeting, John Tyson,

president of Compression Labs, Inc. in San Jose, Calif., said that a significant improvement in video teleconferencing technology is imminent. The coding/decoding equipment commercially available today compresses a standard 90M bit/sec full-motion digital TV signal into a 1.5M bit/sec code; the new technology will further reduce the number of bits required while improving the quality of the picture. Since the cost of video teleconferencing is directly related to the number of bits transmitted, this development should reduce costs to the end user, he added.

Joseph R. Leonardi, president of CXC Corp. in San Jose used the meeting as a forum to announce that his firm has just signed a marketing

agreement with Centel Corp., a major independent telephone carrier, under which Centel will market the CXC "Rose" system, a voice and data private branch exchange (PBX) that includes local-area network capabilities.

The Centel-CXC agreement comes at a time when telephone carriers are being widely criticized for failing to satisfy user demands for sophisticated data transmission services. One indication is the growing interest in "bypass" services able to go around the local-exchange network. Another is a recent Federal Communications Commission study, based partly on interviews with several private and public sector organizations. It reported that "many large users com-

plained about problems with [telephone-company-provided] high-speed data facilities and [network] management tools."

The prediction that IBM is going to announce a local-area network product this year came from Ralph Ungermann, president of Ungermann-Bass, Inc., Santa Clara, Calif. Ungermann, whose company is a major manufacturer of local-area networks, also said, "We're not going to see the seven layers of the [International Standards Organization] reference model standardized in our lifetime" — a reference to the long-term effort to develop a complete set of communications protocols permitting universal interconnection among diverse terminating devices.

They're Trying New Ilk of CRT

GAINESVILLE, Fla. — An experimental display technology similar to LEDs but using less power may eventually be used to develop CRT terminals that emit a minimal amount of radiation.

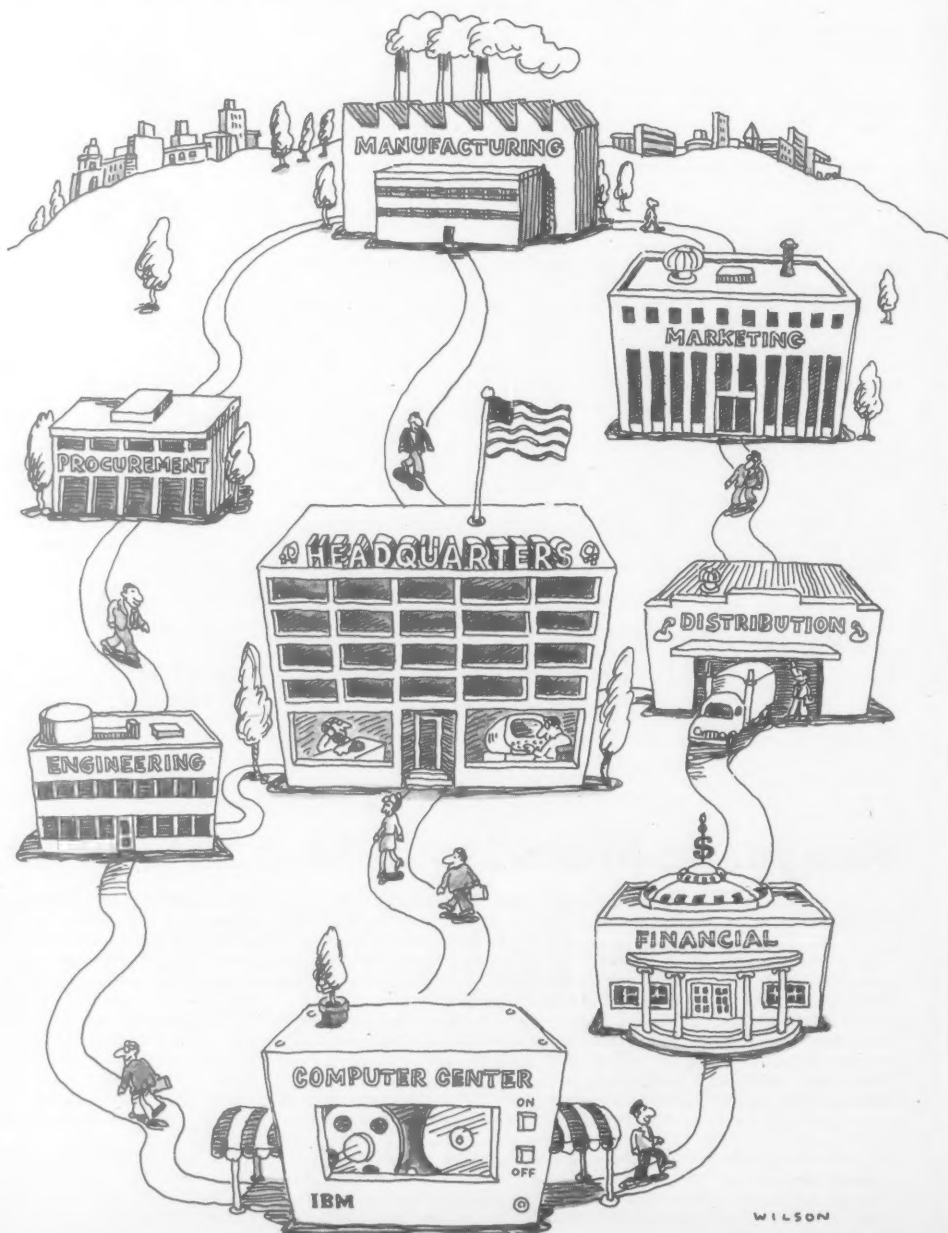
The technology uses a combination of tungsten and oxygen which, when charged, produces a blue glow. Unlike currently used LEDs, the tungsten-oxygen combination does not require a constant flow of electricity to remain illuminated, and it can be seen from virtually any angle.

The last image produced on the tungsten-oxygen display remains visible without maintained power until a reverse current is applied, according to Sey Shing, a graduate research assistant at the University of Florida. Shing is working on the project with Prof. Paul Holloway.

Currently, the tungsten-oxygen displays are being developed for use in calculators and digital watches. The advantage of the new display is that it requires relatively little power to operate and offers the potential of extending the lifetime of devices dependent on battery power, Shing said.

Shing, however, pointed out that the technology could be adapted for use in a CRT terminal. The result would be a CRT terminal that gives off very little radiation — a concern among many office workers.

The big roadblock to integrating the tungsten-oxygen display into CRT terminals is speed, Shing maintained. It takes the tungsten-oxygen display about 15 msec to produce a new image. Conventional CRT screens can do the same thing in about one msec.



Users Group Takes Initiative in Honing Package

By Lois Paul
CW Staff

How does membership in a software package's users group benefit the client organization?

"You get out what you put in" is the response of John Kinker, chairman of the Requirements Committee of the users group for Software Module Marketing, Inc.'s Direct Access Storage Device Management System for OS (DMS/OS) product.

Noting that the economic climate has forced cuts in travel budgets, affecting users group participation, Kinker said, "I think the people who do return will certainly be the ones [in whom] the company recognizes that there is something to be gained ... It won't be the casual attendee,

the minivacation-on-company-expense kind of attendee."

Kinker is a computer systems associate at Rohm & Haas Co., a Philadelphia-based firm, which evidently is agreeable to his spending the time required to organize the reporting of user requirements for DMS/OS. "I spend a lot of time on the Requirements Committee, but I get a lot of benefit because I get to talk to a lot of different people and find out what they do," he said.

DMS/OS runs on IBM and plug-compatible mainframes under OS. It provides a facility to control direct-access storage device (Dasd) usage through a range of marketing reports and a set of modules for taking action on data sets. It is marketed by the

Sacramento, Calif.-based Software Module Marketing and was developed by Software Laboratories, Inc. of San Bernardino, Calif. The two firms cosponsor the users group's annual meeting, which last year attracted about 100 of the approximately 600 DMS/OS users worldwide.

Although the users group is user-rather than vendor-controlled, most of the presentations at past conferences have been by the vendors. Most users lack the time to put together a presentation, explained Donna Ward, a technical support analyst for Ciba-Geigy in Ardsley, N.Y., who is chairwoman of the users group steering committee.

"The corporations that we come from don't necessarily want us to

spend a ... lot of time, because we already are ... spread thin," she added.

Another reason that most of the presentations tend to be by vendors, Ward said, is that the users group members are not as aware as the vendors of what various installations are doing with the product.

However, Software Laboratories became more active in the users group last year and convinced a number of users to make presentations. Both Ward and Kinker agreed the results were excellent. "There was only one vendor presentation. The rest were all from users," Ward reported.

Kinker admitted that the presentations generally are geared toward first users, but said this is helpful for them because "DMS/OS is a very powerful and fairly complicated piece of software. There are a lot of things you can do if you know how." The documentation gives users exits and control-card formats and explains systems parameters, Kinker said, but it cannot tell all of their different combinations to achieve different end results. "So the benefit for a new user is to go talk to people and find somebody with the same sort of problems that they have — Dasd management problems — and find out how they are using DMS and how they combine all of those different parameters."

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Group Provides Requirements

One of a users group's major roles is providing the vendor of a product with its users' "wish list" of modifications.

As chairman for the requirements committee for Software Module Marketing, Inc.'s Direct Access Storage Device Management System for OS, John Kinker screens user requirements to determine that they are neither bug reports (which should be dealt with immediately) nor duplicates. He enters the text of the requirement into a data base and mails a copy to all members of the committee who vote on its priority.

Once composite priorities are assigned to the requirement, it is mailed to Software Laboratories, Inc., the developer of the software, which handles its maintenance and support. Software Laboratories must respond within 30 days regarding whether the requirement is accepted, rejected or under study.

If it is accepted, the firm informs the users which release of the product will include the modification. Twice a year the committee sends a status report on requirements to the entire user community.

From 1979 to 1982, a total of 325 requirements were collected by the committee. About a third of them have been made available in the product or have been otherwise accepted by the vendor, Kinker said.

Poll of MIS Managers Reveals the Majority

By Marguerite Zientara
CW Staff

What would happen to your DP shop if you were run over by a truck tomorrow or — more optimistically — if you were suddenly promoted out of your present position?

The question is one about which DP managers generally have thought and to which they have responded in an informal poll of top management information systems (MIS) executives.

Seven of the 10 DP managers interviewed by telephone recently

felt strongly that a manager should train his own replacement and indicated they are actively doing just that.

Of the three remaining, David Mann, director of information services for Horizon Corp. in Tucson, Ariz., admitted he'd "never thought about it before" and wavered momentarily before deciding, "It has to be a good idea — you don't live forever."

Allan Smith, vice-president of DP for Mountain States Financial Corp. in Albuquerque, N.M., felt it was "probably a half-and-half proposition."

A manager "can train for a while, but sometimes the other person needs new ideas and sometimes a

manager has old ideas," explained Smith, whose attitude likely stems from the fact that "we just lost someone I was training — to another company here in town."

And while the manager of the DP division of a small railroad in Alaska acknowledged that "you generally need someone capable of taking over in your absence or in an emergency," he still was "not sure it's a good idea over a long period of time."

According to the Alaskan, "by the time you get an MIS manager at the corporate level, the organization should integrate him into its long-range strategic planning and they should have someone who's attuned to the business goals rather than DP," making it "almost impossible"

to train one person to assume that position.

While that manager has not groomed someone to take his place, he has an appropriate replacement with whom he has worked for many years.

"I could walk out the door today and be perfectly content that she could carry on and still meet the long-range strategic objectives," he said, "but this didn't happen because I planned it that way."

Threat to Job

Only one of the 10 managers interviewed felt — in theory, at least — that grooming someone for his position could pose a threat to his own job. "There's always competi-

Training Methods Of Managers Vary Slightly

Most managers seem to be training their own replacements, according to an informal *Computerworld* survey, and their methods vary only slightly.

Generally, the task involves letting a subordinate in on decision making while getting his opinions on decisions to be made, delegating responsibility to him, giving the person more outside education and basically making him familiar with the operation.

When giving someone increased exposure to the decision-making process, one should "do that by delegating piece by piece so you can watch his level of competency," according to the DP director at a Miami Beach-based communications company.

One manager, who admitted he is training someone but, he said, "I'm afraid not very systematically," explained that he tries "to establish a continuity of management style."

Teaching Many Functions

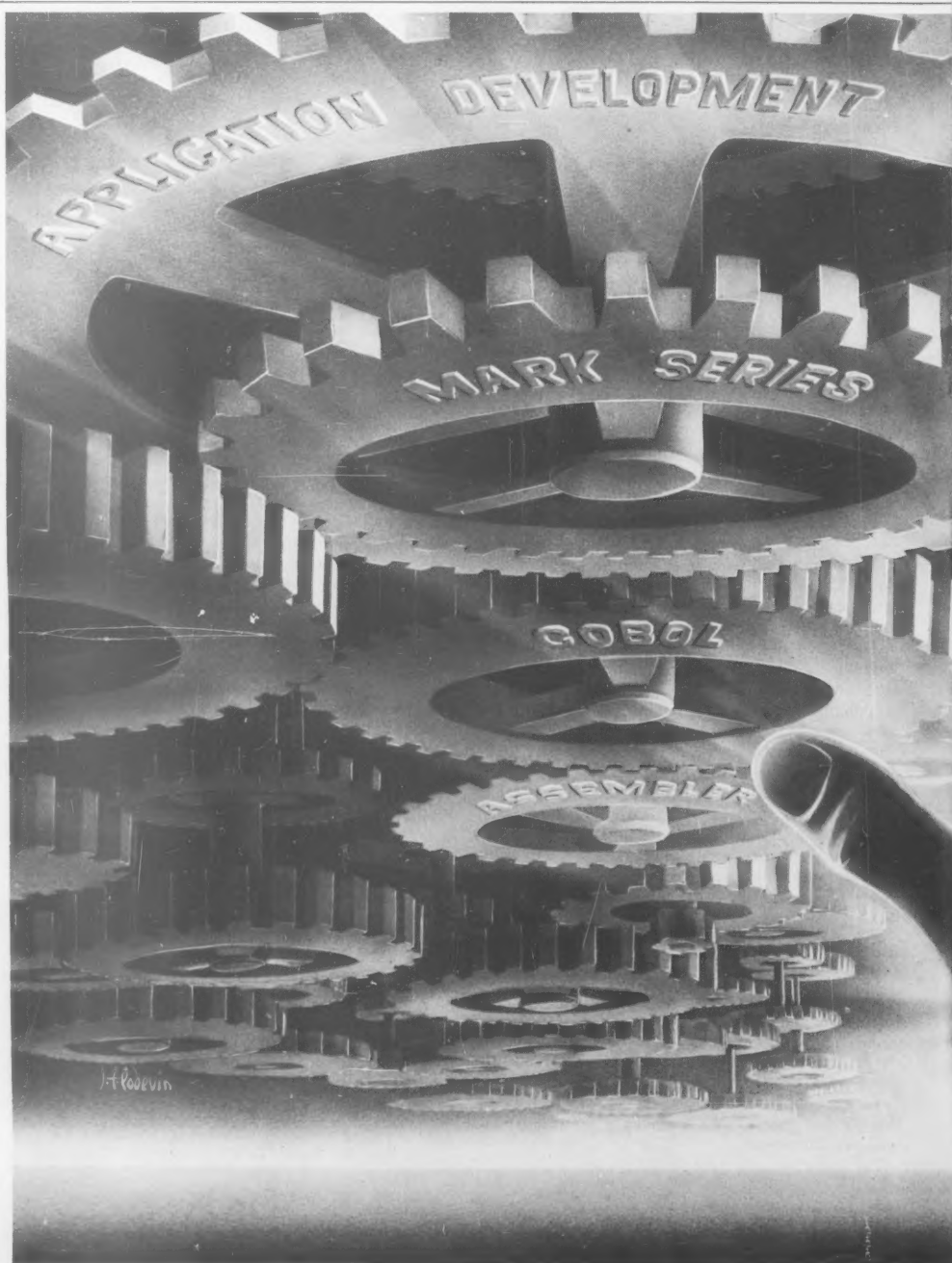
Steve Badger, recently named director of management information systems (MIS) at Beverage Management, Inc. in Columbus, Ohio, plans to "try to teach someone as many functions as possible, although it's not possible to teach someone all the functions and have him do his own functions at the same time."

Badger would, however, "let him interface with upper management."

Having hired someone "with a fairly good background in DP" with training in mind, Lisle Wood, director of MIS at Montana Power Co. in Butte, Mont., explained, "I really need to train him in other aspects of the operation, such as word processing and records management, since I am in charge of all the information management facilities, including data base."

"I periodically let him run one of the facilities for a month or so," Wood explained, adding that he sends his potential replacement to "schools unrelated to DP, such as data base — how to relate data base to information systems and word processing and so on."

Wood concentrates most of his efforts on one person, but he pointed out that while that person is the likely successor, "it's not a foregone conclusion that he's it — other people as well have some opportunity at this."



Actively Training Replacements . . . Just in Case

tion for these higher jobs," observed Lisle Wood, director of MIS for the Montana Power Co. in Butte, Mont.

"Fifty percent of the time, I'd say if he's better at the job than me, let them have him," he said. "And the other half of the time, I don't know. I guess I don't worry about it too much."

A number of managers felt that training a replacement is a good way to be able to move up in an organization — or even to be able to take a vacation or a day off without worrying about the operation.

"My attitude's always been that the more you can do for the people, the higher you're going to go," the DP manager at the railroad in Alaska said. "They might push you, but it'll

be up, not out," he added.

Whether one feels threatened by a well-trained subordinate, the worst can and does happen. Steve Badger,

director of MIS for Beverage Management, Inc. in Columbus, Ohio, was trained over a period of five years by his boss. In a recent merger,

his boss was among 40 people laid off and Badger was promoted to his position. "My good fortune was others' misfortune," Badger said.

What if Trainee Doesn't Fill the Bill?

What if you try to train a replacement for your position and it gradually becomes obvious that your protégé will not fill the bill?

"I've already gone through that," noted Lisle Wood, director of management information systems for Montana Power Co. in Butte, Mont. "I actually found another job for the guy," he recalled. "If he wasn't trainable, you could conclude that he

wasn't successful in the current job he was in."

Wood advised managers to "have at least two people somewhere in the background" as insurance.

While most managers indicated they would stop trying to train a person who did not seem to be working out — and one person said he would "terminate him" — a single manager said he would continue trying to

train the person.

"As long as they're good at their present job, any added knowledge is bound to make them better . . . it's not wasted time," said the production manager of the data center of a Chicago-based publishing company.

Robert Weiser, director of information systems for Bangor [Maine] Hydro Electric Co., stressed that such a situation would "not necessarily be detrimental to how I feel about their present position, especially if it became more of a waste of my time [to train them]."

Of course, it is easier to stop grooming someone as your replacement if you never told them they were being trained in the first place. "If I'd already told the person [my job was opening up], I'd be in a little trouble," explained Allan Smith, vice-president of DP for Mountain States Financial Corp. in Albuquerque, N.M.

"But if I hadn't told them, I'd just discontinue giving them new responsibilities, and I might take somebody I'd put under them out from under them and put them back to their old status," he added.

"But if I'd already told them, I'd really be in a bind — I'd have to tell them the truth, that I didn't think it was working and that the position probably wasn't something they were capable of handling," he said. "I'd better not make that mistake," he concluded.

Cincom to Hold Users Conference

CINCINNATI — Cincom Systems, Inc. will hold a National Technical User Conference here March 20-24.

"The New Era of Information Systems" is the theme of the conference, which was designed to help Cincom users leverage high performance and productivity from the software technology now available to them. This "technical university" for Cincom users will feature industry speakers and consultants, the introduction of major new Cincom products and more than 25 classes for users of the vendor's products.

Author and lecturer James Martin will address "The Impact of Emerging New Technologies." Carma L. McClure, a consultant and author, will make a presentation on "Structured Techniques for Fourth Generation Languages."

Greg Williams, vice-president of the Gartner Group, will provide strategic projections for the decade of the '80s.

The conference will be held at Stouffer's Inn in downtown Cincinnati and the adjoining Cincinnati Convention Center. Further information is available from Cincom at 2300 Montana Ave., Cincinnati, Ohio 45211.

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CW Soliciting Articles on Software

Are programmer productivity packages helping you stretch your DP resources?

Computerworld is planning a Special Report on software packages that improve programmer productivity. Slated to run in the June 27 issue, it will cover systems and utility packages as well as decision support systems, fourth-generation languages and any other nonapplication package tools that programmers use to improve their overall efficiency.

CW is looking for application stories and case studies which describe how these types of packages have worked in your installation. In addition, tutorials (concept pieces that are not product-specific)

are welcome on topics such as "How do you determine what type of programmer productivity packages you need?"

Copy should be submitted by May 6. Please limit the length of the articles to four to seven pages typed, double-spaced. Preference will be given to articles with black-and-white photos (any size) or charts or graphs (originals rather than copies are appreciated).

Copy should be submitted to CW staff writer Paul Gillin, who can also provide a one-page handout providing further details on the Special Report. Gillin can be reached at Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Boston's 28-Hour Blackout Threatens DP Systems In Busy Financial District

By Paul Gillin
CW Staff

BOSTON — While storms that pounded the West Coast during the first week of March caused only spotty problems for DPs there, it was a clear day on March 4 when a blackout paralyzed this city's financial district and a number of computer systems for a nerve-racking 28 hours.

The outage hit several of Boston's key institutions, including New England Telephone Co. and the area's largest bank. But it was the smaller firms that bore the brunt of the lost

day of business.

First National Boston Corp.'s Federal Street skyscraper went black but business continued largely on schedule. "Our computer center is located four miles to the south," said William Synnott, senior vice-president of information systems and services. "For those applications that only had input downtown, we sent emergency personnel [to the computer center] to key in information by hand."

Some minicomputer applications were all that was lost, Synnott said, but they were brought up the next day. A generator kept the bank's vital wire transfer operations going.

Generators a Godsend

Generators proved a godsend for other businesses, too. The world headquarters of the Sheraton Corp. installed a diesel generator only a few months ago. When the lights went out, the motor kicked in and the computer center was running with a loss of about 20 seconds of power.

"The whole worldwide reservation system runs through here," said John Pignataro, vice-president of data processing and systems. "If we'd lost it for 28 hours, we'd have been out a few dollars."

Operations manager Mark Hurwitz said the generator was installed last year with memories of the Northeast blackout of November 1965. "The decision was made as an insurance policy," he said. "Apparently it's one they wisely took out."

Other businesses were not so lucky. Internal systems supervisor Roberta Schwartz was out of her office at the Arthur Andersen & Co. accounting firm when the blackout hit. Because arrangements had not been made for powering down the office's Microdata Corp. minicomputer, the CPU was knocked out by a power surge when the lights came on Thursday evening.

"We lost a day's time," Schwartz said. "Fortunately, there were no head crashes. I'm very surprised there weren't more problems."

To prevent future troubles, Schwartz has left detailed instructions for powering down the system in an emergency.

The company has also made alternative arrangements for processing the payroll elsewhere, should disaster strike on a payday.

The computer staff at Inservco, a mutual funds dealer in Boston, worked through the weekend to make up about 10 lost hours of computer time, according to Anton Thiel, senior vice-president.

Despite the interruption, Thiel said it is unlikely that the small company will take action to prepare for a future blackout.

"There'll be a lot of talk about it, but I would bet that not a lot will get done," he explained, "because somebody's going to figure the odds are long on this kind of thing happening again. But if we have another blackout in the next six months, I think it will get a lot of attention."

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Entrepreneur Working On 'Electronic Jury'

By Bruce Hoard
CW Staff

LA JOLLA, Calif. — The "electronic jury" sits dispassionately, weighing the evidence it has ingested. When the computer reaches a verdict, it delivers it orally to the courtroom. Case closed.

Such is the scenario envisioned by former robotmaker turned electronic-legal-beagle Bernard Lumbart, who said, "All we're doing is lighting the fuse. If we don't do it, somebody else will."

Lumbart is the founder of General Robot Corp. He maintains that a computerized jury is more accurate, unbiased and open than its human counterpart. Furthermore, he said in a recent interview, the current legal system is so bad, that it can only be improved.

And here is how he would do it. The two basic components of his controversial jury are his Zilog, Inc. Z80-based California Computer Products, Inc. computer sys-

tem and a compilation of legal treatises known as the American Jurisprudence Proof of Facts, which lists the facts that must be proved in different types of legal cases.

There are six such basic elements to be proven in, for example, a robbery case, Lumbart said. The human attorneys would be asked to present their evidence, and the computer would decide whether a fact is accepted or rejected. The computer is simply used to quantify the facts. If a fact is accepted, it is placed in a vector or table.

"When you get up to 80% of proof of any one fact, that fact is proven," Lumbart said. "Or when you get to 90% of some other fact, that fact is proven. When you get all the rows and columns added up, you've got a man on his way to state prison for robbery. That's how it works in theory."

Only in Theory

Lumbart's problem is that so far, it only works in theory. When he attempted to present filings on behalf of a federal bankruptcy client, the filings were "utterly rejected" and he was enjoined from further courtroom participation, he said.

Although the name of Lumbart's company is General Robot Corp., it has not offered a robot for sale since the late 1960s, when Lumbart unsuccessfully tried to sell a military robot to the Army. Lumbart is now concentrating on writing software for the electronic jury.

Attorney Daniel T. Brooks of the suburban Washington, D.C., law firm Computer Law Advisers expressed skepticism about Lumbart's innovative legal approach. "Like any other quantitative science, what he's depending on is somebody assigning values and probabilities to something," Brooks commented.

Brooks said Lumbart is trying to use statistics and objective criteria to perform "highly objective" processes. He compared it to somebody interested in buying a computer and using an arbitrary weighting system to decide which system to buy — a process that can be easily rigged, the lawyer declared.

"You can decide whether the guy's guilty by determining what level of proof you're going to require for a particular fact," Brooks observed. However, the legal process can be more systematized, and a system based on Lumbart's could serve as a useful tool for evaluation under the proper circumstances, he noted.

DP Law Program Set for May 12 In Los Angeles

LOS ANGELES — The University of Southern California Law Center will sponsor its fourth annual Computer Law Institute here May 12-13.

This year's program will focus on structuring agreements for the distribution of computer products domestically and internationally. Other subjects to be discussed include: proprietary rights, antitrust issues and major system procurements.

In addition, an optional session will be presented on the basics of computer products and technology.

The conference costs \$350 (\$295 if paid by May 1). Single-day registration costs \$240 (\$195 if paid by May 1). More information is available from Ami Silverman, USC Law Center, University Park, Los Angeles, Calif. 90089.

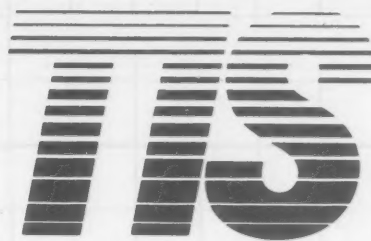
Directory Bows On DP Vendors

CHICAGO — The Chicago Computer Works is offering "The White Book," a directory of computer vendors, products and prices.

The book contains a listing of more than 100 vendors of systems, disk drives, printers, plotters and monitors.

"The White Book" will be issued quarterly starting April 1. Each book costs \$69.95; a year's subscription costs \$139.95, from 7061 N. Kedzie, Chicago, Ill. 60645.

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Users Systems' Stability Termed High Priority

By Jeffrey Beeler *

CW West Coast Bureau

SCOTTSDALE, Ariz. — The task of keeping corporate information systems continuously available and stable for users warrants considerably more management attention than it typically receives, according to State Farm Insurance Co.'s assistant DP director James Yates.

Large-scale computing shops can ill afford to allow unscheduled

downtime to deprive users of their much-needed system resources, Yates said earlier this month during Applied Computer Research, Inc.'s annual conference on performance management here.

If an unplanned resource outage does occur, it had better be kept as brief as possible, Yates added during a brief session on "Managing [Systems] Change."

In today's heavily automated

world of big business, systems availability and stability have become so "critical," he said, that they require close and continuous monitoring by a designated DP staff member.

At State Farm, the responsibility for maintaining an adequate level of systems availability and stability rests squarely on the shoulders of the company's manager of technical support.

But State Farm is probably an exception. At most other companies, the rules of accountability have yet to be so carefully and unambiguously defined, Yates said. Only a comparative handful of big businesses have gone as far as to make corporate DP availability and stability the exclusive responsibility of one individual.

State Farm's rather unusual approach to the problem of maximizing system uptime is one of the "keys" to the firm's success in implementing a DP change-control program, Yates said.

But no strategy for controlling systems changes, no matter how effective, can entirely insulate a company from disruptions in DP availability and stability, he added. Change-control procedures tend to lose some of their effectiveness during user ef-

forts to convert or upgrade to a major new system.

Yates based his conclusion on State Farm's own experiences in implementing a DP change-control program. During the first quarter of 1982, all the company's hardware and software changes were temporarily halted to allow the organization to devote its full attention to application development. The "freeze" on system changes cut State Farm's three-month total of resource outages to roughly 50.

Only one quarter later, however, the number of downtime incidents approximately doubled — a development that coincided with the start of the firm's conversion to IBM's MVS/SP 1.3.

"Our shop was one of the first in the country to migrate to 1.3, but the installation nearly killed us, even though we had an effective change-control system already in place," he recalled.

Yates' experiences with his company's recent MVS/SP 1.3 upgrade have convinced him that the installation of new hardware seldom causes major stability and availability problems. But the opposite is frequently true of conversions to new software, he said.

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Systems Managers Urged To Polish Business Skills

By Jeffrey Beeler

CW West Coast Bureau

SCOTTSDALE, Ariz. — Information systems managers will have to concern themselves more with business than with technology if they expect to contribute to their companies' long-range objectives and effectively interact with top management.

That thought was expressed independently by two speakers at a recent DP performance management conference sponsored here by locally headquartered Applied Computer Research, Inc.

"People who work in the [computing] field have to view themselves as businessmen or businesswomen first and systems professionals second," according to General Electric Credit Corp.'s equipment operations manager, Stewart Stern.

"As managers of a costly corporate resource, they have to have at least some knowledge of finance and accounting. They also have to know how to negotiate contracts and be able to assess the impact of system changes on their companies as a whole."

Stern's sentiments were echoed at

Apple Book Released

LOS ANGELES — Array, Inc. is offering the 1983 edition of *The Book of Apple Software*.

The book reviews various programs on an A through F scale. Programs are given an overall rating, then are judged by their cost value, vendor support, documentation, error handling and reliability.

The 491-page book costs \$19.95 from Array, 11223 Hindry Ave., Los Angeles, Calif. 90045.

the conference by Boole & Babbage, Inc. Vice-President David Vincent, who also serves as general manager of the Institute for Software Engineering.

"Gone are the days when information systems managers can think of themselves just as DP technicians," Vincent said. "Today, they also have to understand fully what kind of business they're in and be able to serve as guardians of the corporate resource called information."

To transcend the bounds of their narrow technical specialties and understand DP's place in the overall corporate scheme of things, computing professionals first must learn how to think and communicate in terms that upper management can readily digest.

In preparing performance-management reports, for example, systems department heads should eliminate all references to CPU utilization figures and other such highly technical data, which senior executives typically find "meaningless," Vincent said.

In the final analysis, he said, one of a performance-management report's main reasons for being is to show top managers exactly how a shortfall in systems capacity would ultimately undercut corporate profits.

So to be effective, a performance-management report should dispense with all extraneous technical details and concentrate instead on providing upper management with a high-level, strategic overview of systems operation, Vincent said. Armed with such an overview, senior executives will then be in a position to decide how best to match system resources to their organizational objectives.

N.J. Governor Seeking To Modernize State System

By Paul Gillin
CW Staff

TRENTON, N.J. — Declaring that "New Jersey can no longer afford the luxury of our outdated and inefficient method of processing information," Gov. Thomas Kean has asked the state legislature for \$20 million to modernize the state's computer system. The request was made despite the fact that New Jersey must cut \$350 million from its operating expenses in order to comply with a state law mandating a balanced budget.

The initiative is contained in a \$6.8 billion budget request Kean submitted to the legislature on Jan. 31. The appropriation would be used primarily to tie together the state's five data centers in a network and to set up an Office of Office Automation. The state will also look at the organization of DP within the state with an eye to establishing a central DP authority.

The recommendations are one result of a joint review of state spending undertaken by representatives from private industry and state government and administered by the state Treasury Department's Office of the Budget. The Governor's Management Improvement Plan quickly targeted data processing as a deficient area, according to Michael O'Neal, a management analyst in the Office of Management Services.

"We assessed how far out of line [DP was] with model states and found we were lagging badly," O'Neal said. "Some people commented that the tools we were using were a generation apart from current technology."

Current recordkeeping procedures are so outmoded that in some departments all records are still processed manually, according to Dennis Clark of Science Management Corp., a consulting firm hired by the Management Improvement Plan. "The Temporary Disability Department has 240 employees processing claims in what is really a green eyeshade operation," Clark said. "By automating, we estimate we could reduce that force by 30 to 50 people through attrition and reduce the level of management."

The state's five DP centers report to the departments in which they are located but service other departments as well, Clark said. The DP department in the Department of Transportation, for example, reports to the Secretary of Transportation but serves nine other departments. And none of the state computer systems can communicate with one another.

DP operations are so disjointed, he said, that a request for a microcomputer takes about nine months to process.

The budget request is scheduled to be taken up in joint legislative hearings on March 15. The issue will not be the need for computerization so much as the sacrifices other departments will be required to make, a Senate spokesman said. No major opposition to the governor's initiative has yet been expressed in the legislature.

Kean will justify his initiative by pointing to savings individual departments will realize through reduced administrative costs. State authorities pay for DP services as they are used, in the same style as a service bureau. "If these monies [\$20 million] are not made available, more dollars will be required by the various departments to maintain current service levels," the request stated.

The \$20 million request represents a "first step," according to a spokesman for the governor.

New Jersey has been scaling back its DP operations since 1972. At that time, there were 13 data centers and 28 separate computers, Clark said.

Dvorak Keyboard on Trial in N.J.

NEWARK, N.J. — An experiment currently under way in New Jersey is expected to provide enough data to convince state officials to convert the state clerical staff of 7,100 to the Dvorak keyboard. The move is expected to bring a \$7 million savings in the first year.

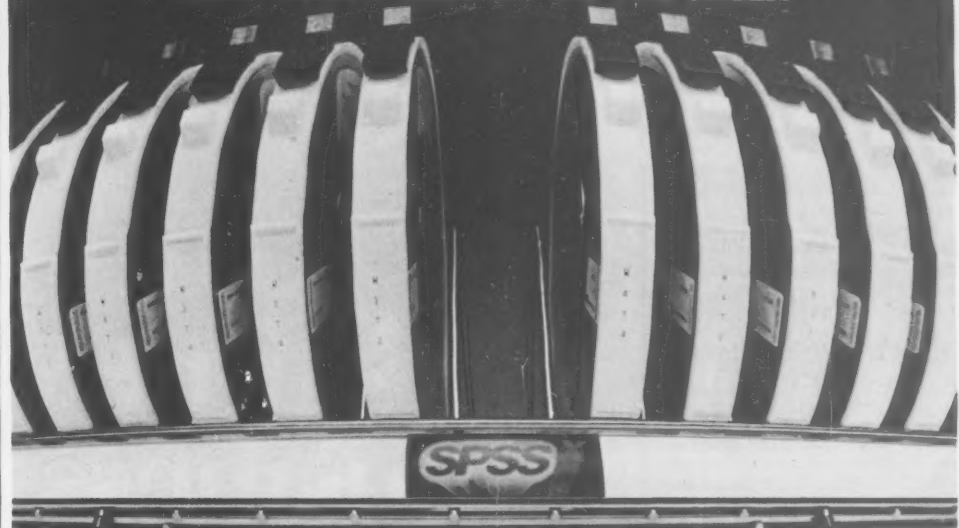
The experiment, under way in Trenton and planned for Newark, provides training on both the traditional Qwerty keyboard and on the Dvorak keyboard — embraced last week by the American National Standards Institute [CW, March 7] — for state employees, handicapped clients of state agencies and the unskilled unemployed.

The project has the backing of

New Jersey's governor, the civil service commissioner and other influential state officials, according to Larry Picatello, regional training manager of the New Jersey Civil Service Department, which is conducting the experiment.

Picatello estimated conversion costs at \$60 per typewriter, \$70 to \$100 for training per person and the additional cost of release time. But Picatello expects to more than make up those costs in reduced fatigue, lower absenteeism, higher productivity leading to as much as a 5% to 8% reduction in employees and fewer repairs to Dvorak keyboards resulting in estimated savings of \$7 million.

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MIS Groups Predicting Budget Growth: IDC

By Patricia Keefe
CW Staff

BOSTON — Although their expectations that they would spend substantially more in 1982 than 1981 did not pan out, management information systems (MIS) departments are again projecting strong budget growth in 1983, particularly in the areas of software, services and communications, according to a recent information industry briefing session sponsored by International Data Corp. (IDC).

Other user plans for '83 include the education of end users, consideration of advanced communications, a response to diverse equipment types and a review of long-range plans.

At last year's briefing session, IDC's suggested concerns as the industry "approached the bottom of the recession trough" included saving money, trimming recruitment dollars, scrutinizing communications expenses, increasing equipment price/performance ratios, deferring staff additions and taking advantage of the 1981 Economic Recovery Tax Act "to get more bang for the buck." Almost universally, MIS was asked to do more with less in '82, noted Tom Willmott, program manager for IDC's Strategies for Office Systems user program.

Therefore, despite users' fall '81 expectations for high budget growth in hardware, software, services, communications and other areas, actual results for '82 were much lower, to the point of dropping below '81 growth plateaus in some areas, Willmott said.

Quoting *Business Week*, Willmott said the reasons for what he called

"such a precipitous decline" included the three-month moving average for inflation, which dropped from nearly 12% when the '81 survey was done to less than 4% in October of '82, where it remains today. He also pointed to the Index of Industrial Output, which was 150 in January '81 and dropped to 136 in Oct. '82.

Continued purchasing of equipment outside the centralized authority of the MIS department, which affects the MIS budget, is another factor, Willmott said.

An IDC-sponsored user survey taken in fall '82 indicated that users believe '83 will be better. Pointing to anticipated growth figures for 1982-83, which reflected the unmet growth predictions for 1981-82, Will-

mott said that "while more normal for our high-growth industry, these numbers might be considered equally perplexing. Are they left over from an inflationary mindset? Or are they overly optimistic?"

Willmott suggested that packaged products will continue to be attractive to MIS departments short on staff in specialized areas, which are growing.

In addition, the importance of communications features is becoming more widespread. "Nineteen eighty-three is the year of the local-area network," he said. Interest level in communications is high, according to Willmott, especially if users can "piggyback" a feature onto existing equipment.



CW Photo by P. Gillin

'Nineteen eighty-three is the year of the local-area network,' said IDC's Tom Willmott.

Fortune 500s Seen Purchasing 50% of Micros

BOSTON — About one microcomputer in five ends up in a large company, and 50% of the micros purchased in retail stores land in Fortune 500 companies, according to a survey of 30 large corporations released by International Data Corp. (IDC) at its 1982 Information Processing Industry Briefing Session held here recently.

With multimillion-dollar buys of micros underway, management information systems (MIS) executives are faced with the problem of "what to do about the [micro] plague," according to Tom Willmott, program manager of IDC's Strategies for Office Systems user program.

As a result, serious planning challenges will evolve in the '80s that are unrelated to the traditional management responsibilities of the late '60s and '70s.

Rapid Proliferation

At the focal point of this change is the rapid proliferation of small systems, Willmott said.

"Clearly we are in a situation where the training of end users and a number of other management issues may tend to impact the delivery of

(Continued on Page 22)

It's time your business profess

End-User Needs Will Drive Software Mart Through 1988, IDC Researcher Predicts

By Paul Gillin
CW Staff

BOSTON — End-user requirements will drive the software market for the next five years as declining hardware costs and advances in user-friendly methods expand the availability of DP resources, according to Ann Morley, senior research manager of software and services for International Data Corp. (IDC).

Speaking at the recent IDC Information Processing Industry Briefing Session here, Morley said the information center concept will flourish in the near future. IDC predicted 53% of all sites running an IBM 30 series mainframe will have by the end of

the year a center in place to support end-user requirements.

"Shops will be gunning to act like commercial time-shared vendors," she said.

Packaged Applications

Many vendors have responded to user needs by offering packaged applications, a trend that will continue, Morley said. IDC predicted a steady growth in packaged software revenues from \$5.5 billion in 1982 to \$28 billion by 1988, a 37% annual increase. Suppliers of application tools will see the greatest growth, with those packages occupying 37% of the market by 1987, she said.

IDC expects microcomputers to change the face of the software industry, Morley indicated. Annual sales of microcomputer software are expected to grow from \$965 million in 1982 to nearly \$7.5 billion in 1987, IDC estimated. Independent suppliers will continue to turn out the lion's share of micro software. Independents already supply 50% of that market, and their share is expected to grow to 55% by 1987, according to IDC figures.

"When IBM and DEC [Digital Equipment Corp.] entered the [micro] marketplace, they believed their sales depended on independents being able to supply software," Morley



CW Photo by P. Gillin

"Shops will be gunning to act like commercial time-shared vendors," IDC's Ann Morley predicted.

said. "The speed of growth [in the micro software market] is largely due to this."

The '80s will also see a change in distribution channels for all kinds of software, Morley noted. Increasingly, packages will become available over cable and telecommunications networks. Microcomputer packages in particular will be distributed to mass markets with vendors taking a lesson from Madison Avenue in slick packaging techniques.

"In the new mass marketplace, software technicians will concern themselves with advertising, price competition and distribution," Morley said. Already, the major microcomputer software vendors are spending 10% to 15% of their budgets on advertising, she noted.

IMC Distributes Second Edition

BETHESDA, Md. — The International Information Management Congress (IMC) is distributing the second edition of *Fundamentals of Systems Analysis*, first published in 1981 by John Wiley and Sons.

The authors — Jerry FitzGerald, Ardra F. FitzGerald and Warren D. Stallings Jr. — cover each step of a systems analysis from the problem definition through system design to the final implementation.

New topics presented in the second edition include software engineering, structured design and data base management systems.

The 590-page hardbound text costs \$39 from IMC, Publications Sales, P.O. Box 34404, Bethesda, Md. 20817.

Vsam Course Offered For IMS Programmers

BELLEVUE, Wash. — Software Information Services, Inc. is offering "Vsam For IMS Programmers" for presentation around the country. The course will also be given June 7-10 by the First National Bank of Chicago.

The course is said to cover the features of Vsam data set structures that interact with IMS such as Vsam data set usage within IMS access methods and IMS buffering techniques.

An on-site presentation costs \$3,100, plus the expenses of the instructor. For attendees, the course costs \$230 per person. Software Information Services can be reached through P.O. Box 4132, Bellevue, Wash. 98009.

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Multifunctional Desktop Units Predicted To Take Dominant Position in OA Tech

By Paul Gillin
CW Staff

BOSTON — Office automation, a technology identified with word processing and imaging systems, will expand in scope in the latter part of the decade with multifunctional desktop computers taking over the dominant position, according to David Terrie, senior analyst/office automation at International Data Corp. (IDC).

Speaking at IDC's Information Processing Industry Briefing Session here recently, Terrie predicted the office system of the future will feature expanded voice/data communications capabilities, data base management systems, improved graphics and simpler human interfaces. IDC expects the market as a whole to grow to \$44 billion by 1986, a com-

pound annual growth rate of 21%.

Intense competition between word processing, data processing private branch exchange and desktop computer vendors and suppliers of computer services will present the end user with a wide range of options, Terrie said.

Terrie called the desktop computer "the terminal of the future," but indicated that vendors must move confidently into the market to establish a presence. "[Apple Computer, Inc.] went after the market early and their results have shown," he said.

He quoted an IDC survey that showed that 64% of businesses using desktop computers do some word processing on the machines. However, desktops have not yet offered any real competition to word processing vendors, he said. That is expected to

change: IDC estimates that by 1986, about 85% of small business computers will have some word processing functionality.

Local-Area Nets

Terrie called local-area network standards "a political football deflated" and predicted that local-area network technology will be driven by the base of installed devices. "Standards aren't going to make it in the office," he said. "Instead of compatibility through standards, we'll get conversion options that will convert code from one vendor to another."

Trends in imaging technology will be toward improvements in high-speed dot-matrix printers, the quality of which is already approaching daisywheel letter devices, Terrie said. Facsimile technology will move toward higher resolution graphics printed on plain paper. And a steady decline in prices will continue to characterize the imaging field.

Watch for better graphics integration in 1983, he advised. Conversion facilities will improve to link systems from small vendors with those of major manufacturers. Documentation, both hard copy and on-line, will improve, particularly for desktop computers. And look for more simple user interfaces along the lines of Apple's mouse and icon. "That's definitely the wave of the future," Terrie said.

Micro Trends Surveyed

(Continued from Page 20)

systems and the effective use of them in our organizations at least in the near term," Willmott said.

For example, "many end users have already charted the perilous do-it-yourself course in computer acquisition, often without the slightest notion about operating systems, data security or application software availability or any of an entire group of critical concepts to which they're really completely oblivious," Willmott said.

As a result, MIS departments are swamped and burdened with requests to evaluate or install equipment for end users.

The pressure keeps building for the information systems specialists to provide technical management leadership on a whole range of new systems, Willmott said.

Two Forces

Where the use and purchase of micros is concerned, Willmott identified two such forces at work: end users wanting to avail themselves of the processing power of technology vs. centralized MIS, which has to work under formal guidelines and wants to maximize the organization's manpower and financial resources.

"There's a lot of foam on the water here, and we are still waiting to see how it should be resolved," Willmott

maintained.

While the percentage of all computers purchased within the organization is slowly slipping out of MIS control, the MIS department is gaining control over the purchase of micros.

The percentage of micros acquired under MIS control has risen from 3% in 1977 to 15% in 1982 and is expected to grow to 35% by 1987, Willmott noted.



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'I Never Expected to Go From Burned In to Burned Out Today.'

To Promote Science, Mathematics House Passes Education Bill for Up to \$1 Billion

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives has passed a mammoth education bill that would provide as much as \$1 billion over five years to increase technical personnel availability, assist computer instruction and promote science and mathematics education in the U.S.

The Emergency Mathematics and Science Education Act, whose Senate counterpart is already under consideration in that body, was approved 348 to 54 by the House on March 2. One section of the bill would establish a special engineering and science personnel fund of \$100 million for each of five years beginning in 1984 within the National Science Foundation (NSF).

The fund is needed, the legislation says, because of the "pressing

need for trained technicians and engineers for the nation's industry and defense, with particular concern for such high-technology fields as electronics, information technology and energy."

Under the bill, NSF grants would be awarded for, among other things:

- Recruitment and retention of new engineering faculty at colleges.
- Development of systems for post-secondary technical, engineering and scientific education with special emphasis on computer accessibility.

- Precollege science and mathematics education and training, including programs to promote cooperation and exchange of resources and personnel with industry and other elements of the private sector.

According to the House Education and Labor Committee, demand for computer engineers is expected to

exceed supply by 40% in 1985; DP technicians demand is expected to grow by 148% by 1990; and the demand for computer analysts will rise 80% by the end of the decade.

Without the concerted program of teacher development embodied in the bill, those demands will go unmet, according to the committee, which had earlier approved the bill 27 to 3.

The House Science and Technology Committee, which joined the education panel in drafting the legislation, sent it to the House floor on a unanimous vote of approval.

National Crisis

One supporter of the legislation, Rep. Tom Harkin (D-Iowa), said "the situation with respect to computer-related degrees is approaching the level of a national crisis. With more and more students clamoring for computer degrees, and at a time when there are roughly twice as many computer-related jobs as there are graduates to fill them, the pool of qualified teachers has been drying up."

Picking up the theme of a technical manpower and teaching "crisis" — a term used frequently throughout the House debate, Rep. Thomas E. Coleman (R-Miss.) warned that "our citizens are rapidly becoming unable to deal with the computer age, in jobs or at home, and soon

many of us will be computer illiterates."

The bill's supporters likened the legislation to the 1958 National Defense Education Act, a measure passed following the 1957 launching of the Soviet *Sputnik* satellite and designed to remedy the perceived failings of American science and engineering education. The new legislation, however, is aimed more at answering the high-tech challenge of this country's competitors in Japan and Western Europe.

A second section of the bill would provide an initial, one-year amount of \$325 million — with an unspecified amount to follow in later years — to be administered by the Education Department to promote mathematics, science and foreign language improvement programs at the elementary, secondary and post-secondary education levels. This section is aimed at alleviating what the bill's sponsors called a "critical" shortage of math and science teachers at all levels.

The bill targets the money for student scholarships and teacher training and retraining in these areas. This legislative provision has similar strong, bipartisan support in the Senate but is far in excess of the \$50 million proposal submitted earlier this year by the Reagan administration for mathematics and science education programs.

MIT June Meet to Probe Managers' Changing Role

CAMBRIDGE, Mass. — MIT's Center for Information Systems Research (CISR) has announced that its summer session, "Current Issues in Information Systems: The Changing Role of Information Systems Management," is scheduled for June 13-17 at the Hyatt Regency Hotel here.

The session will emphasize managerial, organizational and technical issues related to information systems management, a spokesman said.

General sessions will cover such areas as management of end-user computing, personal computer technology and industry trends, decision support systems, human resource

management for information systems, planning for office automation and strategy and policy issues, a spokesman said.

Elective sessions reportedly have been slated to include areas such as: implementation strategies, project selection, project management, computer conferencing, privacy protection and data flow restrictions and critical success factors as well as telecommunications.

Tuition for the seminar is \$1,650, a spokesman said from CISR at MIT, Sloan School of Management, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139



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In International Telecommunications Move Now on Policy Formation, NTIA Outlined

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The U.S. is risking a "catastrophe" in the international telecommunications and information arena because of the federal government's failure to respond to political, economic and defense challenges to American interests, the Commerce Department concluded.

Discussing emerging national and international "restrictive trends" in this environment, Commerce's National Telecommunications and Information Administration (NTIA) told Congress this month that "a gradual erosion of the U.S. position in the telecommunications, information flow and associated high-technology markets may result, absent prompt remedial action."

The NTIA's ominous conclusions were outlined in a 300-page report mandated by Congress in an NTIA spending bill passed last year [CW, Sept. 6]. The agency solicited inter-agency support and received 44 private sector comments in producing its massive study of long-range U.S. goals in international telecommunications and information.

The NTIA document discussed in detail goals, policies and strategies, where they exist and developed numerous alternatives for upgrading U.S. government structures to respond to new developments. NTIA

Telecommunications Goals

WASHINGTON, D.C. — Free flow of information and free competitive market enterprise are the two broad principles to which the U.S. will adhere in working toward its goals in international telecommunications and information, the National Telecommunications and Information Administration (NTIA) said this month.

Defining particular U.S. goals in this area, NTIA pronounced that basic, long-term American goals "are those which, if achieved, will provide a stable national and international environment commensurate with our basic principles of national existence." Sheltered beneath that lofty policy umbrella, NTIA said, this nation's principal goals include assuring:

- The free flow of information worldwide, subject only to the most compelling national security and personal privacy limitations.

- The necessary growth of the national security, public service and commercial interests of the U.S. occur in a manner commensurate with its leadership role in the world.

- That information flow to developing nations con-

tributes fully to the elimination of hunger, poverty, disease and ignorance and facilitates their sound economic development.

- There is a free and competitive marketplace for telecommunications and information services equipment and facilities.

- There are efficient nonpolitical international organizations for the development, management, expansion and nondiscriminatory access to international telecommunications facilities and networks.

- That human well-being and understanding grow as rapidly as possible through international telecommunications services.

Strategies for pursuing these goals, NTIA said, must combine effective government organization to implement related policies developed with private-sector input. The agency called for "positive, preemptive actions" and an end to a "damage control" response to international problems. But the report also noted the U.S. often operates from a position of strength in these technological areas and suggested sometimes it is better to refrain from negotiating its policies and goals.

supported its "harsh conclusions" by noting a long history of federal failure to come to terms with this topic's "critical implications" for U.S. social, economic and political interests and examined the increasingly aggressive foreign policies restricting American high-technology enterprises.

U.S. participation in international organizations, particularly the International Telecommunications

Union, is included in the study, as are separate chapters on telecommunications facilities and networks, including the role and future of the Federal Communications Commission; international telecommunications services; trade in equipment and services; information, including transborder data flow and intellectual property rights; research and development, including government support and tax policies; and national security, including defense considerations and encryption.

The report stated: "The U.S. government has undertaken false starts in seeking to prepare itself to respond to these situations. Policy has evolved in piecemeal fashion. Problems have been aggravated by inadequate high-level attention and insufficient coordination among the diverse departments and agencies involved."

"The net result," NTIA said, "too often has been confusion, needless jurisdictional disputes and consequent lack of adequate preparation — all of which place the U.S. at a serious disadvantage." Calling for a re-examination of U.S. strategy and government organization, the report warned "that interests at stake demand high-level attention and seri-

ous political commitment to ensure that U.S. interests are not compromised by default."

The "optimal government structure," the agency suggested, would be characterized by, among other things, high-level attention and responsibility, a central locus of coordination and decision making with adequate authority for implementing policy, expert technical and negotiating staffs, efficient data gathering mechanisms and an expeditious and effective private-sector problem-solving apparatus.

Looking realistically to the future, NTIA said "foreign resistance to marketplace principles" — a keystone of U.S. policy in this area — "is often solidly entrenched, and international support for free flow of information is by no means on the rise."

The agency suggested the U.S. "should thus seek to avoid the development of any omnibus, all-encompassing treaties or manifestos that would impose a rigid structure on an area in which problems and opportunities cannot be effectively anticipated given the rapid pace of technological and commercial change." Instead, the report said, U.S. strategy "should support the attainment of broad objectives on an issue-by-issue basis through consistent, coordinated preparation and positive action."

Marconi's Daughter to Keynote TCA Conference in September

SAN DIEGO — Gioia Marconi Braga, daughter of the late Marchese Senatore Guglielmo Marconi, inventor of long-distance wireless communications, will keynote the Telecommunications Association (TCA) 21st Annual Conference here Sept. 26-30.

The theme of this year's conference is "Telecommunications — Gateway to the World." Braga is expected to speak on her father's achievements in relation to today's communications technology.

Braga was awarded an honorary doctorate from Memorial University of Newfoundland and is an honorary member of the Society of Wireless Pioneers and of the Veterans' Wireless Operators Association. She is director of the Center for Italian Studies at Columbia University.

The TCA conference costs \$100 for members and \$500 for nonmembers. Further details are available from TCA conference headquarters at 424 S. Pima Ave., West Covina, Calif. 91790.



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CWS 14/83

Census Bureau Urged to Consider Micros for '90

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — Early and comprehensive planning is the key to successful large-scale systems implementation, particularly when the system will be used to conduct the 1990 decennial census, congressional auditors said recently.

The cost of that undertaking could reach \$4 billion. The data processing portion of that sum is, understandably, not definite at this point, but the Capitol Hill investigators at the General Accounting Office (GAO) noted in a recent study that the 1980 census data processing expenses ran to \$271 million for data collection and tabulation, both manual and automated. The data processing expenditures account for only one-fourth of the estimated \$1 billion 1980 count.

While the Census Bureau is already well into the planning process for the next census, a process that includes looking at new computer and telecommunications technologies and consideration of a possible "paperless census," the GAO concluded time is quickly running out for some basic DP decisions by the bureau.

Use of Micros Urged

In particular, the GAO said in its study, requested by the House Census Subcommittee, that the bureau should consider possible use of microcomputers and commercial scanning devices in the 1990 head count. To complete the 1980 census, the bureau used scanning equipment designed and built by the agency itself and tens of thousands of clerks to collect and process 88 million questionnaires, containing 3 billion items on 226.5 million persons.

The subcommittee was concerned because completing all the planned tabulations will take as long as 3½ years from the April 1980 census date. Besides time consumed settling extensive litigation resulting from the last census' methodology, the large manual component

of the count caused some of the delay, according to both GAO and the Commerce Department, the Census Bureau's parent agency.

The major thrust of planned census automation is to reduce field operations through automation and to modernize the operations of the bureau's central DP operations here. The GAO concluded that the Census Bureau has made "a good start"

in its planning process but said it is worried that the bureau is not coordinating separate facets of its automation plans with the 1990 census planning.

The bureau is conducting a large-scale systems procurement to implement a fully integrated automated DP and telecommunications system for the bureau's needs through the mid-'90s, a procurement with an esti-


mated \$98 million price tag.

The GAO report noted that the Census Bureau historically has needed four to five years to get its systems up and running, and that figure does not include prior testing and evaluating the reliability and compatibility of various types and combinations of equipment. The bureau will seek initial 1990 census planning funds for the fiscal year beginning this

October.

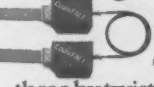
The census agency said it is "hopeful" of automating many of the currently manual census applications. But as far as a "paperless census" — which might include more use of phone and direct phone-to-computer techniques and use of microcomputers — the bureau said, "it may not be possible to perfect such systems for the next census."


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ICL Funding Program to Develop 'New' DPer

By Bob Johnson

CW New York Bureau
NEW YORK — "The DP manager was the agent of change in the computer industry, but he has lost his way."

"A new computer professional — the 'information engineer' — will take his place and be the practitioner of technology that will lead companies into the next era of information processing."

That is the prediction of Robb Wilmott, managing director of International Computers, Ltd. (ICL), the UK's largest computer company. ICL feels so strongly about the emergence of this new type of DPer that it is providing 50% of the funding for a Master of Science degree program in the UK concentrating on information engineering. Its cosponsor is the UK Science and Engineering

Research Council.

The two-year program is scheduled to begin this May with 30 students at the Kingston Polytechnic Institute. Eighteen one-week modules that combine standard DP technology with advanced management skills will be offered to prepare professionals to "understand technology as well as the benefits of technology," as ICL describes it.

ICL is concerned about the capabilities of DPers in the near future because the world is "knee-deep in information but doesn't know what to do with it," Wilmott explained in a recent interview here. Because most management information systems (MIS) and DP managers are struggling to get work out of their shops within a certain time frame, they are not really in a position to

be concerned with the overall value of information and what a company can do with it.

"In the last 10 years we have gone from batch systems to on-line systems, and what was then a monthly crisis for the MIS manager has now become a daily crisis," Wilmott said.

Moreover, he added, most companies today are unhappy with DP spending in relation to what they get out of it.

An information engineer — a person who understands the technology and can get the right mix of hardware, software and communications working so that information is where it is needed most — is the type of professional needed, ICL maintained. But it is just as important that this person must also be skilled in management so he can understand company goals.

"The goals of the company have got to be analyzed, the flow of information must be analyzed, the capabilities and expectations of what the available technology can do for the company must be considered and how necessary changes will occur are the foremost considerations" for the information engineer, Wilmott said.

The computer industry in the future will become more dependent on competent professionals and with the escalating rate of technological advancements and corporate information needs, ICL maintained that the MIS manager in his current role will not fill the bill.

"Some DP managers will become information engineers if they adapt, otherwise they will just continue to keep the factory running. Users don't buy technology, they buy solutions," Wilmott concluded.

Non-DPer Get Training Course

SEATTLE — Boeing Computer Services Co. has released an enhanced version of its "Making It Count" videotape training program for noncomputer professionals.

The training program, which is designed to introduce people to computers, now consists of 223 transparencies and 23 half-hour videotape sessions. The additions to the program reportedly enable non-DPer to conduct the course.

The course costs \$8,600 and the instructor's aid options cost \$950. Boeing's Education and Training Division can be reached through P.O. Box 24346, Seattle, Wash. 98124.

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Managers on the Move



Kaili Skolnik

KAILI SKOLNIK has joined Kentex Information Systems, Inc. as manager of systems planning and development in Allendale, N.J. Skolnik will be responsible for managing technical systems, as well as for directing product planning and development.

Prior to joining Kentek, Skolnik was manager of major accounts for marketing at Monroe Systems for Business and Litton Industries, Inc. Before joining Litton in 1980, she was employed by Xerox Corp. and General Electric Information Services Co.

Skolnik graduated from Lehman College in New York, with a B.S. in mathematics and received an M.S. in computer science engineering from

Columbia University.

ANDREW GEGOR JR. has been appointed manager of management information systems for McCormick Properties, Inc. in Hun Valley, Md. Geger served as accounting manager since 1981 and previously was financial planner.

Before transferring to McCormick Properties, Geger was corporate financial analyst for the parent company, McCormick & Co., Inc., in Baltimore.

Geger graduated from the University of Maryland in 1973 with a B.S. in financial management and accounting. He also studied at Loyola College in Maryland and Price George's Community College and

the University of Baltimore.

STEPHEN I. POOK has been named divisional vice-president of corporate information systems, and KARLIS V. RUTINS has been appointed divisional vice-president of organization planning for American Hoechst Corp. in Somerville, N.J.

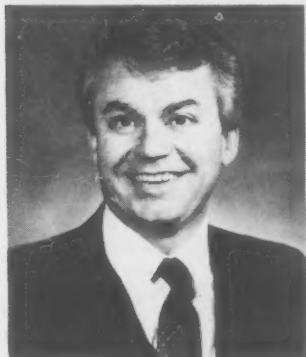
Pook joined American Hoechst in 1972 and has served as director of corporation information systems since 1979. Previously, he held other managerial positions in the financial and information systems areas.

He received a B.S. in business management from Farleigh Dickinson University, Madison, N.J.

Rutins served as divisional vice-
(Continued on Page 28)



Andrew Geger Jr.



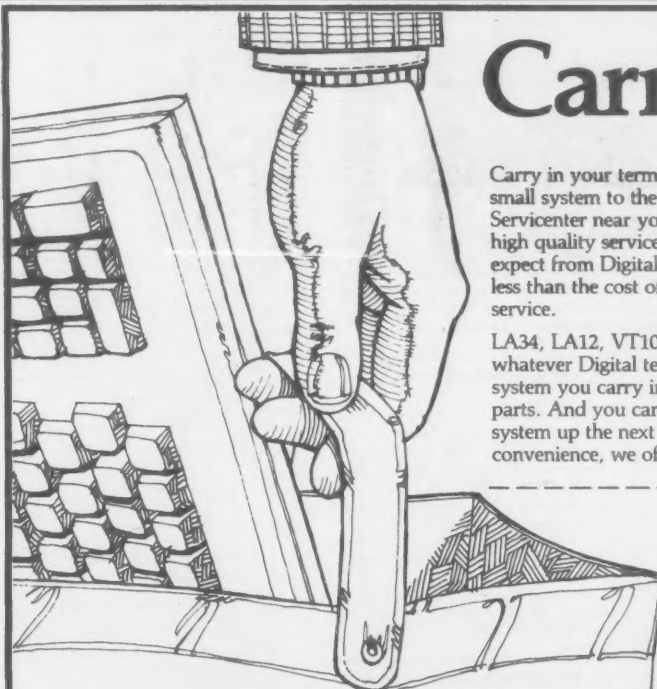
Stephen I. Pook



Karlís V. Rutins



Michael N. Thompson



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(Continued from Page 27)

president for corporation information systems since January 1980. He joined the firm in 1966 as systems manager and was promoted to director of information systems in 1971.

Rutins received a BSME from the New Jersey Institute of Technology and an M.S. in industrial engineering and management from Columbia University.

MICHAEL N. THOMPSON has been appointed vice-president of information systems at the New Hampshire Insurance Co. in Manchester, N.H. The New Hampshire Insurance Group is a member of American International Group, Inc., a holding company whose insurance subsidiaries engage in property, casualty, marine and life business in more than 130 jurisdictions around the world.

In his new position, Thompson

will provide all systems development and data processing services for the New Hampshire Insurance Group.

Thompson joined the New Hampshire Insurance Group after serving since 1980 as director of applications development for the Domestic Brokerage Division of American International Group Data Centers, Inc. He was previously responsible for developing personal lines systems and actuarial support systems for two major insurance organizations headquartered in Philadelphia.

He attended the University of New Mexico in Albuquerque, N.M.

LISA A. EISENBERG has been promoted to vice-president of adminis-

tration for Bellofram Corp., a Rexnord Co. in Burlington, Mass. Eisenberg will be responsible for all administrative staff functions, including accounting, data processing and human resources.

Eisenberg was formerly vice-president of human resources. She joined Bellofram in 1976 as a personnel assistant.

Eisenberg holds a B.A. in American history and literature from Harvard University.

ALAN S. FEINSTEIN and WILLIAM J. NEUSER were both named vice-presidents and senior technical consultants for Security Pacific National Bank in Los Angeles.

Feinstein joined Security Pacific

in 1980 as a senior systems programmer. He holds a bachelor's degree in mathematics and a master's degree from the University of Southern California.

Neuser joined the bank in 1981 as an assistant vice-president and systems programmer. He is an alumnus of the University of California at Los Angeles.

STEPHEN MILLER has been promoted to director of data processing for Nassau County, N.Y. He will direct and coordinate systems analysis and programming, technical services, operations and office automation.

Before working for Nassau County, Miller was a systems engineer for Grumman Aerospace Corp.

Miller received his bachelor's degree in aerospace engineering from Polytechnic Institute of New York and his master's in management science from C.W. Post-Long Island University.

RAY KENNEDY has been named director of management systems for Quality Micro Systems (QMS) in Mobile, Ala. He will be responsible for management information systems, purchasing and product managing. He will also oversee internal coordination and communication for his department.

Prior to his promotion, he worked at First Southern Federal Savings and Loan Association in Mobile, Ala., for seven years. Before joining QMS, Kennedy was employed at Teledyne Continental Motors as credit and warranty manager for 10 years.

Kennedy is a graduate of the University of South Alabama where he received a B.S. degree in business administration.

JAY ROTH has been appointed manager of data processing for ITT Industrial Credit Co.'s Automated Finance and Lease Division in St. Paul, Minn. ITT Industrial Credit Co. is a financing and leasing company.

Roth previously worked as a software support specialist for R2E of America, located in Roseville, Minn.

He received an MBA degree from the College of St. Thomas, St. Paul, and a B.S. degree in mechanical engineering from Case Western Reserve University, Cleveland, Ohio.

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EMCE will present a select number of quality exhibits featuring the latest in business-oriented hardware, software, peripherals, systems, accessories and resources. Plus a broad-based program of carefully developed and professionally presented Executive Conference Sessions designed to attract and inform a sophisticated audience of key decision makers.

EMCE will draw attendance from throughout the Northeast, and primarily from Metropolitan New York — the business center of the world and an area representing the greatest concentration of potential microcomputer users to be found anywhere.

As an exhibitor, you'll meet executives from all segments of the business market — from small businesses and professional organizations to large corporations and institutions — from people who work directly with

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June 23-25, 1983
Sheraton Centre, NY, NY

micros to those responsible for the creation and maintenance of huge corporate networks. These are people seeking up-to-the-minute information and hands-on product exposure in the business-like setting the EMCE that provides.

Executive Conference Sessions

The focus of EMCE will be a comprehensive schedule of technical and tutorial forums led by recognized experts in their respective fields. All Conference Sessions are designed to help today's executives learn how to choose and how to use the microcomputer products and services that are revolutionizing the way they do business.

Topics have been carefully chosen to complement the theme of the show, and thoughtfully scheduled to give attendees time to see all the exhibits.

Here are some of the topics to be offered:

- Introduction to Microcomputing and Its Applications
- Corporate Microcomputing

- Technological Developments in Personal Computing
- Microcomputer Market Opportunities
- Basics of the Home Office
- Professional Microcomputer Applications
- The Home Family Micro-World
- Computers in Education

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EMCE is sponsored and promoted by the Conference Management Group of CW Communications/Inc. (CWCI), publishers of *Computerworld*, *InfoWorld*, *ISO WORLD* and *PC World*. CWCI is the largest and most respected publisher of computer-related newspapers and magazines in the world. All of which means you'll get the benefit of CWCI's experience, knowledge and credibility.

For complete details on program and attendance call 800-225-4698. In Massachusetts call 617-879-0700.

For Exhibit Information Contact:

Ms. Doris Rosner, Mitch Hall Associates
P.O. Box 860, Westwood, MA 02090
(617) 329-8334

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Can Poor MIS Status Be Remedied?

Q There have been rumors for the past several years that my boss, the director of management information systems (MIS), will be promoted to vice-president of MIS. It has not happened and I don't think it ever will.

Top management has openly voiced its displeasure with the performance of MIS. Their reluctance to promote the director indicates to me that they are not pleased with his performance. It seems as though management has accepted MIS as a necessary evil with a mediocre manager. I see no changes on the horizon.

My concern is the careers of almost 50 people. Lack of technical progress and challenge has caused these careers to stagnate. Some of our best people have already left. Would you suggest I do the same or stay put and try to improve the situation here?

A If it appears that a change of management and/or MIS emphasis will not be forthcoming within the next 18 months, then you should seek employment

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

elsewhere. If there is a chance that you might get his job or the director will be replaced with a capable person, you might wish to stick it out.

It sounds as if top management and the director of MIS are taking a status quo approach to the information revolution. Today's MIS directors cannot just sit back and take things as they come. Successful MIS directors keep top management continuously apprised of all alternatives, even those with political implications. Mediocre managers advocate middle-of-the-road positions.

Q I am at mid-career and about to receive my MBA. Although my experience and education (M.S.) has been in food technology, I want to move out of this low-growth arena into the high-tech field. I thought I could do this best through sales of computer equipment to the food industry, to universities or to the federal government.

As I read through the ads for salesmen, however, I am increasingly aware that my lack of knowledge of computerese and specific hardware and software products may prohibit me from reaching my goal.

I have been doing extensive market research and have identified several firms I believe could use my skills, but I am unsure how to approach them. I have a strong computer aptitude and have taught myself several languages.

Any suggestions as to how I might approach potential employers?

A Being conversant in computerese is close to the bottom of a recruiter's list of desired qualifications for a computer salesman. Recruiters are looking for someone who can make a favorable impression and have the ability to convince customers to buy their products. As far as the technical aspects of selling hardware, you need only to demonstrate an ability and willingness to learn. Most vendors have excellent training programs.

Your qualifications are superior to the majority of applicants seeking positions in hardware sales. Ap-

Turnaround Time

By Larry E. Long

proach potential employers as someone with experience, education and interest in cross-training to the field of computers.

It would be counterproductive to mention your desire to sell to a specific market. Your initial market assignments will be based more on immediate needs than professional background.

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Time: 12:00 - 6:00

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DPers Must Readjust Career Ideas To Succeed in Info Industry: Exec

By Bob Johnson

CW New York Bureau

NEW YORK — DPers who think of their careers only in terms of hardware and software have a very narrow idea of how they will fit into the information industry in the future, members of the Association of Women in Computing (AWC) were told here recently.

Walter P. Blass, director of strategic planning for AT&T, told a meeting of AWC's New York chapter that the traditional perception of information processing and distribution must be adjusted by computer professionals if they plan to succeed in the field.

Blass noted that DP, telephony and publishing are

beginning to blend together and that hard distinctions between the fields are disappearing. "The information business is becoming dependent on technologies which will be directly related to each other," he said.

Companies like AT&T and IBM are beginning to overlap in certain areas of information, Blass commented. He said that since the recent divestiture of the AT&T operating companies, the company is moving toward becoming a "conduit" type of information provider, one which supplies the means of communicating data. IBM is also moving into this area, and both major industry forces are good examples of the changing nature of computer and information company plans. Blass pointed out that computer professionals should look at these moves as signposts to guide them in their aspirations.

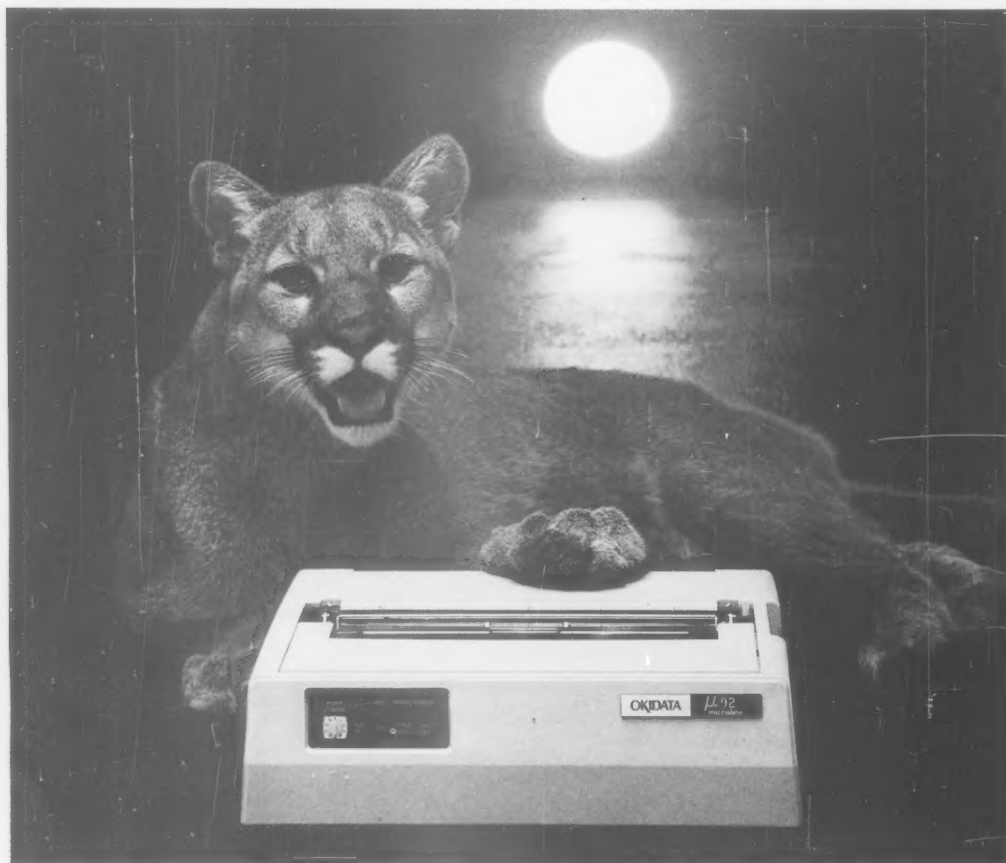
OA Revolutionized

"For example, areas such as office automation will be revolutionized within the next 10 to 15 years. Telecommunications will be the next big invader into this area — bringing with it a merger of office automation and DP. I/O devices, voice and even optical-image recognition will gradually emerge and erode rows and rows of staff positions," he commented.

Blass told the AWC that such industries as communications and artificial intelligence, which are now moving into information processing, are the ones DPers should be interested in. He used the typical factory floor as an analogy to illustrate his point. "Tasks such as monitoring factory equipment — which used to take 50 men to do — are now monitored by one man looking at multiple CRT screens. It will not be too long before artificial intelligence is applied so perhaps even that one man is not needed."

Although Blass could not give specific areas, subjects or disciplines that the DPer should follow to keep up with the times, he did emphasize that goals and capabilities be kept in mind.

He said that although it is true that the technologies will change, it does not mean the DPer has to pursue a technological goal. As information becomes more and more user-driven, managerial skills will become increasingly important. If that is where the DPer's strengths lie, steps should be taken to formulate a career plan in that direction.



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Like each in our full line of high performance printers, the new ML 92 and 93 are built strong to keep on run-

ning, right down to the print head that's guaranteed for one full year. But the really great news about each is price: \$699 suggested retail for the ML 92; slightly more for its wide-column partner. Absolutely purrrfect.

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ICCP Hands Out Awards To Top CDP Exam Scorers

CHICAGO — The Institute for Certification of Computer Professionals (ICCP) has given Awards of Excellence to the top ten scorers in the 1982 Certificate in Data Processing (CDP) examination.

The awards are presented annually to the highest aggregate scorer and to the top scorers in each of the five sections of the examination. A total of 3,914 candidates sat for the test in May 1982 and slightly more than one-third (1,427) passed.

Award of Excellence winners include the following:

- Nation's Top Scorer: Michael R. Heath, Creve Coeur, Mo., employed by Ramsey Corp., St. Louis. Heath also tied with two others as top scorer in Section 2 Programming and Software. ICCP will present a \$500 scholarship in Heath's name to the

Campbell Elected President of ICCP

CHICAGO — Robert P. Campbell, president of Advanced Information Management, Inc. of Woodbridge, Va., was recently elected president of the Institute for Certification of Computer Professionals (ICCP).

Campbell is former chairman of the Computer Crime Information Conference.

In addition, he serves as national director of the Association of Computer Programmers and Analysts.

college of his choice.

- Section 1, Data Processing Equipment: Joel N. Weisberg, Monsey, N.Y., employed by Price Computer, Inc., Mountainside, N.J.

- Section 2, Programming and Software: Three-way tie among Heath; Paul F. Almquist, Eau Claire, Wis., employed by District 1 Technical Institute, Eau Claire; and Daniel Urban, Hollidaysburg, Pa., employed by Butterick Fashion Marketing, Altoona, Pa.

- Section 3, Principles of Management: Three-way tie among Gregor C. Avison, Bellevue, Wash., employed by Peat Marwick Mitchell & Co., Seattle; Nicholas G. Boyaris, Chicago, employed by Allstate Insurance Co., Northbrook, Ill.; and Robert Schaich, Rocky Hill, Conn., employed by Aetna Life & Casualty Co., Hartford, Conn.

- Section 4, Quantitative Methods: Tie between Robyn L. Birkhead, Hyattsville, Md., employed by Peat Marwick Mitchell & Co., Washington, D.C.; and Miriam H. David, San Diego, Calif., employed by Steres, Alpert & Carne, San Diego.

- Section 5, Systems Analysis and Design: David C. Kapell, Syracuse, N.Y., employed by P&C Food Markets, Syracuse.

The next CDP exam will be given May 7. More information is available from the ICCP, Suite 1752, 35 E. Wacker Drive, Chicago, Ill. 60601.

Audit, Control Meet Set for May 9

CHICAGO — "New Vistas in Information Systems Audit, Control and Security" is the theme of the 13th Conference on Computer Audit, Control and Security slated to take place here May 9-13. The conference will be sponsored by the EDP Auditors Foundation.

With 96 presentations and 13 two-day courses, the meeting focus on systems posing the greatest control

problems, according to its sponsor. The multitracked program is aimed at audit managers, security professionals, systems designers and quality assurance personnel, in addition to data processing auditors.

The conference costs \$795. Further details may be obtained from the EDP Auditors Foundation's Education Department, P.O. Box 2051, Winter Park, Fla. 32789.

ICCP Publication Discounted

CHICAGO — "Systems Analysis and Design: A Foundation for the 1980s" has recently been made available at a discounted price from the Institute for Certification of Computer Professionals (ICCP).

The 553-page publication is a com-

pilation of past ICCP proceedings. It includes 34 papers on current practices of system analysts and designers throughout the industry.

The text now costs \$29, down from \$67.50 from ICCP, 35 E. Wacker Drive, Chicago, Ill. 60601.

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Off the Press

This month's 'Off the Press' is devoted to microcomputers in the business environment. The books are grouped into functional areas and since each title is self-explanatory, descriptions are brief.

For those who want more information on this latest data processing frontier, Computerworld's Special Report this month, appearing in the March 28 issue, will focus on micros in business.

General Introductory Books

MICROCOMPUTERS IN LARGE ORGANIZATIONS

By Thomas William Madron

Madron shows how to implement microcomputers in a planned, organized manner, including the manager's workstation, word processing, data collection, planning and modeling, statistical analysis and data communications. Glossary, index.

Softcover, 182 pages, ISBN 0-13-580787-5, \$12.95. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

MASTERING MICROS

By Hannah I. Blank

This book wisely devotes just five pages to what a computer is, then jumps right into problem solving, identifying needs, capacity planning and software and hardware selection. A thoughtful, succinct book for

managers.

Hardcover, 303 pages, ISBN unavailable, \$24.95. Petrocelli Books, Inc., 1101 State Road, Princeton, N.J. 08540.

HOW TO MANAGE YOUR SMALL COMPUTER... WITHOUT FRUSTRATION

By Hillel Segal and Jesse Berst

This is a real how-to book, covering installation, maintenance, crime proofing and disaster planning. It also covers managing the people who will use the microcomputer and concludes with a useful section on getting more out of your micro. The authors' disk backup system is an outstanding feature, as are the many work sheets.

Softcover, 246 pages, ISBN 0-13-423665-3, \$14.95. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

MICROCOMPUTER DATA COMMUNICATIONS SYSTEMS

By Frank J. Derfler

A basic, no-nonsense primer on microcomputer communications, from terminals to modems to information utilities, from a communications manager with the Department of Defense.

Hardcover, 129 pages, ISBN 0-13-580720-4, \$17.95. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

WRITING IN THE COMPUTER AGE

By Andrew Fluegelman

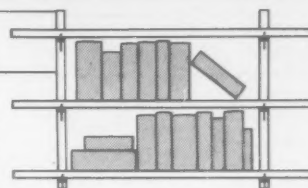
And Jeremy Joan Hewes

This book is for writers — journalists, business people or casual correspondents. It explains word processing hardware, software and techniques, but it also delves into writing, editing and organizing styles and strategies.

Softcover, 254 pages, ISBN 0-385-18125-6, \$10.95. A Doubleday Anchor Book, 245 Park Ave., New York, N.Y. 10167.

Hardware

The following books augment the documentation which comes with the microcomputer by clarifying techniques and offering tips from more experienced users — such as the author. Many publishers offer



these machine-specific books; here with a sampling from publishers active in this subject area.

THE TRS-80 MODEL III USER'S GUIDE

By Tony Bove and Leroy Finkel

Softcover, 252 pages, ISBN 0-471-86242-8, \$12.95. John Wiley & Sons, 605 Third Ave., New York, N.Y. 10158.

(Continued on Page 34)

For those who think good service only comes in big blue packages...

MDS may not be as large as you-know-who, but we're equally committed to you-know-what. Service. Fact is, we feel so strongly about this aspect of our business that we formed an entire division to support it!

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Off the Press

(Continued from Page 33)

THE APPLE II USER'S GUIDE

By Lon Poole

Softcover, 388 pages, ISBN 0-931988-46-2, \$16.95. Osborne-McGraw-Hill, 2600 10 St., Berkeley, Calif. 94710.

USING THE OSBORNE-1 COMPUTER

By T.G. Lewis

Hardcover, 211 pages, ISBN 0-8359-8142-8, \$30. Reston Publishing Co., 11480 Sunset Hills Road, Reston, Va. 22090.

If you have a video tape recorder, you may be interested in **HOW TO USE YOUR IBM PERSONAL COMPUTER IN 10 EASY VIDEO LESSONS** or **HOW TO USE YOUR APPLE II IN 10 EASY VIDEO LESSONS**. The IBM tape runs over two hours; the Apple tape runs one hour and 45 minutes. Both are available in VHS or Beta format at \$120. The tapes are created and produced by Kennen Publishing and distributed by Stoneware, Inc., 50 Belvedere St., San Rafael, Calif. 94901.

Software

THE SOFTWARE RESOURCE BOOK FOR PERSONAL COMPUTER USERS

Edited by Kimberly Perry Leonsis

This is a new directory that contains articles and an extensive index listing over 3,000 business and professional software programs for microcomputers. It includes what machines or operating systems the software runs on, price (when supplied) and company particulars.

Softcover, 400 pages, \$12.50. Redgate Publishing Co., 3407 Ocean Drive, Vero Beach, Fla. 32960.

INFOWORLD REPORT CARD: EXPERTS EVALUATE MICROCOMPUTER SOFTWARE

Edited by Scott Mace

This is a collection of *InfoWorld* newspaper's software reviews, categorized by machine or as running on Digital Research, Inc. CP/M computers. It includes system requirements, price and company particulars.

Softcover, 128 pages, \$3.95. *InfoWorld*, 530 Lytton Ave., Palo Alto, Calif. 94301.

DATA BASE MANAGEMENT SYSTEMS

By David Kruglinski

This covers the concepts behind file, relational and network/hierarchical data base management systems and discusses in detail the current DBMS packages, as well as associated software, for microcomputers.

Softcover, 260 pages, ISBN 0-931988-84-5, \$16.95. Osborne-McGraw-Hill, 2600 10th St., Berkeley, Calif. 94710.

Softcover, 260 pages, ISBN 0-931988-84-5, \$16.95. Osborne-McGraw-Hill, 2600 10th St., Berkeley, Calif. 94710.

AN INTRODUCTION TO VISICALC MATRIXING FOR APPLE AND IBM

By Harry Anbarlian

This book helps you create reusable matrices that extend Visicalc's usefulness beyond normal spreadsheet functions. A few examples are credit card records, T-bill investments, zero-base budgeting and organizational charts.

Softcover, 252 pages, ISBN 0-07-001605-4, \$22.95. McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

HOW TO USE SUPERCALC

By Deborah Willis, Jerry Willis

And Merl K. Miller

This book walks the reader step-by-step through one of the most popular spreadsheet packages. It is also a reference manual for program functions. Work sheets used as examples in the text are available on diskette.

Softcover, 102 pages, ISBN 0-88056-095-9, \$19.95. Dillithium Press, P.O. Box 606, Beaverton, Ore. 97075.

OSBORNE CP/M USER GUIDE, Second Edition

By Thom Hogan

This is a complete primer on CP/M and CP/M-86 (16-bit), which covers commands, utility programs, reference lists and how to implement

CP/M. An all-in-one reference.

Softcover, 292 pages, ISBN 0-931988-82-9, \$15.95. Osborne-McGraw-Hill, 2600 10 St., Berkeley, Calif. 94710.

INTRODUCTION TO BASIC PROGRAMMING

By Gary B. Shelly

And Thomas J. Cashman

While there are many books on Basic programming, this one is unique in its extensive classroom use and for the fact that it contains over 500 color illustrations. Functional and eye pleasing as well.

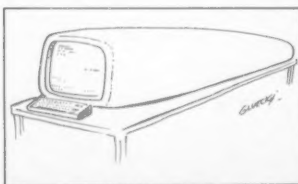
Softcover, approximately 400 pages, ISBN 0-88236-118-X, \$14.95. Anaheim Publishing Co., 2632 Saturn St., Brea, Calif. 92621.

It used to be frightening to outgrow a 4300.



Anyone who has ever outgrown IBM's 4300 Series knows about the bear-sized gap between the 4300's and the 3083. In performance and in price!

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'Data In Depth.'

Three-Person DP Staff Backs \$21 Million Firm

EL CAJON, Calif. — How large a staff does it take to run the data processing center for a \$21 million, 410-employee company?

Only three, according to DP specialist Robert Wilson of Chem-Tronics, Inc., a manufacturer of engine components for the aerospace industry.

The three programmer/analysts at Chem-Tronics have been neither overworked nor backlogged with requests since the department installed a Cobol program generator in October 1981. The generator has cut applications development time up to 200%, Wilson said.

"We do virtually all our screen and report formatting" with Bytek, Inc.'s Cogen generator, "together

with file definitions and other more mundane tasks," Wilson explained. "In fact, only about 20% of the code we produce is still written by hand."

Chem-Tronics uses a 1.5M-byte NCR Corp. I-9050 computer with 30 terminals and three printers. Much of the data handling is done by IMCS II, an NCR package that includes modules for inventory, bill of materials, routing, work in progress and a status module for general accounting, payroll, accounts receivable and accounts payable.

Fills Gap

Wilson said that Cogen fills a gap between the NCR package's capabilities and the corporation's special needs. "The information we require

already resides in the data base," he said, "but we often need to sort, format or display it in a different manner. In a sense, we use the generator as a querying system."

Written in RM/Cobol, Cogen allows programmers to paint screen displays and output formats. Reports can be developed using optional headers, multiple detail lines and control breaks, conditional detail line printing, selected data from reference files and flexible page size and spacing, a spokesman said.

A project recently completed by Wilson tracks standard labor hours (the amount of time that is anticipated in manufacturing a given part) by department on all Chem-Tronics final assembly products.

Wilson used Cogen to access the indexed item master file containing all part and assembly level numbers. He then positioned the pointers in the bill of materials file. He also placed pointers from the master file to the routing file, which contained the production path for each part through the company's 100 work centers, as well as the time required at each stop.

After the pointers were established, Cogen was used to read the files and obtain the data, Wilson said. He manually wrote the code necessary to do the final computations.

"The generator writes all the selects, record contains, picture clauses and the rudimentary procedures itself," Wilson said. "The remaining 20% you're left with is not only the most technical but the most interesting."

Chem-Tronics also uses Cogen to develop applications that are independent of the IMCS II and accounting packages, Wilson said. One query and report system developed for the company's aviation repair section took four weeks to finish. Wilson estimated that without Cogen, the job would have required three to four months.

Furthermore, Wilson said, the generator has allowed the DP department to remain small and responsive to users. "We are vertically oriented, with each member having an area of responsibility and a single programmer overseeing a project from start to finish," he said. "It's a much more satisfying arrangement."

Finally, Wilson noted that the generator imposes a programming standard on the entire shop. Cogen prefixes are uniform, which means "you don't have to worry about programmer personalities," he stated. "The generator imposes a good de facto standard, and any one of us can pick up our colleagues' work and immediately follow the flow."

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WINNIPEG, Man. — "Computer Technologies for Productive Learning" is the theme for the Fourth Canadian Symposium on Instructional Technology to be held Oct. 19-21 at the Westin Hotel here.

Sponsored by the Associate Committee on Instructional Technology of the National Research Council of Canada, the symposium is intended to inform the academic and business communities of recent advances in computer-aided learning technology and applications.

Topics to be addressed will include computer awareness and literacy in schools and society, computer aids for the handicapped, productivity improvement methods and systems technology.

The registration fee is \$110 if paid before August 31 and \$140 after that date.

Further information is available from Conference Services Office, National Research Council of Canada, Ottawa, Ont., Canada K1A 0R6.

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Communications Package Helps Textile Firm Weave Efficient Net

VALDESE, N.C. — Communications software is helping a textile manufacturer here weave its order processing network into an efficient unit.

Alba-Waldensian, Inc., a \$50 million textile manufacturer that specializes in casual wear for women, men's socks, hose, dance and exercise apparel and knit suiting

fabric, had relied on the U.S. Postal Service to carry orders from three major clients to its central offices and warehouse. But the process proved too time-consuming for a business that relies on high volume for its livelihood.

For example, it took about five days for batch orders from K-Mart Corp. in Detroit

to reach the company. Another three days were consumed keying the orders into Alba-Waldensian's IBM 370/145 mainframe.

Similar times were recorded for J.C. Penney Co., Inc. and Sears Roebuck & Co. Together, the three retail chains provide about 40% of Alba-Waldensian's business.

"We had to get into an environment where we could receive orders from our main customers by teleprocessing — for economy's sake if nothing else," recalled Grady Zimmerman, Alba-Waldensian's DP manager.

Zimmerman heard about SMM/Tracs, a communications package offered through Software Module Marketing of Sacramento, Calif. Zimmerman was already familiar with the work of Dave Matthews, the software's developer. Without evaluating other systems, Alba-Waldensian signed on with SMM/Tracs last May. The package utilizes an IBM 3704 communications controller and a modem.

The DP department had the package tested within two hours of installation and up and running within four days, Zimmerman said. Now, the 80,000 annual orders from the three customers are received and processed entirely in batch.

Keying Times Eliminated

"With SMM/Tracs, the orders come in around 11 a.m. and are out in the mills for picking and packing by the next morning," he said. "We have also eliminated all keying times." Zimmerman said the package has enabled the company to reduce its order processing time by 500% and has eliminated errors caused by rekeying.

Zimmerman's staff was pleased by the ease of installation features of SMM/Tracs. "With no experience at all in teleprocessing, we have been able to walk in and talk to our customers, who are using some of the most sophisticated approaches in the business, with no problems."

Because the package can communicate with nearly any computer using batch bi-synchronous communications, "it has opened up networking possibilities within individual stores," he said. Alba-Waldensian has already hooked in with Sears' retail network. Sears sends in order inquiries, which Alba-Waldensian processes. Responses are sent back to Sears over data communications lines and transmitted by Sears to the local stores.

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```

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WALTI SERVICE
IMF/WORKLOAD ANALYZER 1.0

TRAN FLOW COMPONENT
CURRENT PERIOD 00:00:00 - 00:00:00
HISTORY 00:00:00 - 00:00:00

INPUT COMMUNICATIONS
  Ssl Dsk - CIO  (1.16) (2.62)
  INPUT QUEUE    (83.68) (63.23)
  All HPR's Busy (81.91) (60.86)
  MPP CU         (1.77) (2.37)
  SCHEDULING     (1.16) (2.62)
  FETCH I/O Active (1.16) (2.62)
  APPLICATION PROGRAM (3.53) (7.46)
  DL/I-CTL Using CPU (0.04) (0.06)
  TRM END Wait    (3.49) (7.86)
  SYNC POINT     (3.49) (7.86)
  LTRM Wait      (3.49) (7.86)
  OUTPUT QUEUE    (2.33) (5.24)
  Node Busy      (2.33) (5.24)
  OUTPUT COMMUNICATIONS (4.45) (10.48)
  MPP Pool Space (4.65) (10.48)

RESPONSE TIME (SEC) 100.39 79 SAMPLES 100.39 1,034 SAMPLES
# OF TRANSACTIONS 67 0 MIN/39 SEC 67 8 MIN/39 SEC

```

IMF/WORKLOAD ANALYZER™ allows you to pinpoint the IMS component or resource responsible for workload performance degradation.

```

BOOLE & BABARGE
IMF/RESOURCE ANALYZER 1.0

STAT SERVICE SYSTEM STATUS
DATE 82/12/08 TIME 14:52:30

RGN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
TYPE BWFI BWTI MPP MPP MPP MPP MPP MPP MPP MPP MPP MPP MPP MPP
STAT DL/I WF-W ACTV SCHED IDLE ACTV INAC INAC INAC INAC INAC INAC
WARN W-PI NOBK

TOTAL FREE % ALLOCATED %
--IMS DATA SETS--
SHORT 5,500 1,925 35 3,575 65 (HI= 3602)
LONG 7,200 1,080 15 6,120 85 (---THRESHOLD)
QBLKS 1,400 800 50 800 50 (HI= 1263)
DTM LOG 7,200 0 0 7,200 100 (---WRAPPED)
DISK LOG 4,800 2,400 54 2,400 46

--PI POOL--
CURRENT 92,160 90,768 99 1,392 1
MAXIMUM 204,800 203,408 100 1,392 0
STOPPED RESOURCES-- LINES: 2 TRANS: 0 DB'S: 1 RTDC'S: 5

RESTART TIME HH:MM:SS
--SCHEDULING-- FAILURES: 18,540 30% SCHEDULING STOPPED (---DYNAMIC LOG
CLASS 001 002 003 004 005 006 007 008 009 010 011 012 013 014 015
Q'D 0 75* 2 4 1 0 28* 0 116*
PROC 10%68 29154 3322 6008 14076 105 1406 0 65039

```

IMF/RESOURCE ANALYZER™ provides a window into IMS, showing you the full panorama of status and activity, including IMS Fast Path.

```

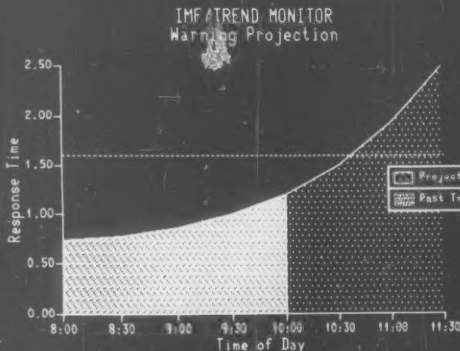
BOOLE & BABARGE
IMF/WORKLOAD MONITOR 1.0
PLOT SERVICE ASYNC PLOTTER
DATE 82/08/28 TIME 09:51:08

TOTAL 32,503 TRANS ARRIVALS (TRANS) START 07:05:0
1% SAMPLES PERIOD 00:10:00 INTERVAL 00:01:00 ELAPSED 02:46:0
AVG INTVL ----- AVG/SEC -----
TOTAL ----- U ----- 9.0
PREV PD ----- U ----- 12.0
CURR PD ----- U ----- 10.0
INTERVALS ----- U -----
09:42:00 ----- U ----- 10.7
09:43:00 ----- U ----- 11.0
09:44:00 ----- U ----- 9.3
09:45:00 ----- U ----- 8.6
09:46:00 ----- U ----- 9.7
09:47:00 ----- U ----- 10.3
09:48:00 ----- U ----- 10.4
09:49:00 ----- U ----- 11.2
09:50:00 ----- U ----- 14.6
09:51:00 ----- U ----- 12.8
MAX at 09:50:00

RANGE: 0---500 501---100 1001---1500 1501---2000 2001---2130 --TOTAL--
DIST: 13 8x 30 18x 103 62x 15 4x 5 3x 16x 100

```

IMF/WORKLOAD MONITOR™ and IMF/RESOURCE MONITOR™ provide over 100 services to track IMS activity, and to graphically show you how any monitored activity is behaving over time.



IMF/TREND MONITOR™ gives you advance warning of probable or impending IMS problems, so corrective action may be taken before user service is affected!

```

BOOLE & BABARGE ---- IMS MANAGEMENT FACILITIES ---- IMF/SYSTEM EVALUATOR 1.0
SELECT OPTION ===

09:49:14 IM05000 TRAN ARRIVALS BY CLASS(TOTAL) = 24 ( 25) IN 40 SECS
09:50:00 IM05000 AVG RESP TIME BY TRANSCODE (CASHOUT) = 7.8 ( 35.0) SECS
09:50:00 IM05000 AVG RESP TIME BY TRANSCODE (DEPOSIT) = 4.2 ( 35.0) SECS
09:52:22 IM05111 RECOMMEND SUSPENDING UNNECESSARY WORK --
09:52:22 IM05111 SUGGEST STOPPING TRANS: INQUIRY1,INQUIRY2,USELESS,OPTIONAL

At this time the MTO stops the following TRANSCODES:
INQUIRY1,INQUIRY2,USELESS and OPTIONAL

09:54:14 IM05011 TRAN ARRIVALS BY CLASS(TOTAL) = 21 ( 25) IN 40 SECS
10:00:00 IM05011 AVG RESP TIME BY TRANSCODE (CASHOUT) = 4.3 ( 35.0) SECS
10:00:00 IM05011 AVG RESP TIME BY TRANSCODE (DEPOSIT) = 3.9 ( 35.0) SECS

```

IMF/SYSTEM EVALUATOR™ assesses the status of your IMS system, using the continuous input from IMF/WORKLOAD MONITOR and IMF/RESOURCE MONITOR, and proposes corrective action for any revealed IMS performance problems.

```

BOOLE & BABARGE ---- IMS MANAGEMENT FACILITIES ---- IMF/SYSTEM MANAGER 1.0
SELECT OPTION ===

1 EXCEPTION - DISPLAY EXCEPTIONS TO IMS OPERATION
2 NETWORK - DISPLAY LINE/TERM/NODE INFORMATION
3 DATABASE - DISPLAY DATABASE INFORMATION
4 TRANSACTION - DISPLAY TRANSCODE INFORMATION
5 PROGRAM - DISPLAY PROGRAM INFORMATION
6 APPLICATION - DISPLAY APPLICATION GROUP INFORMATION
7 LOG DISPLAY - IMS LOG DISPLAY FACILITY
8 ANALYZE - IMF WORKLOAD OR RESOURCE ANALYZER
9 MONITOR - IMF WORKLOAD OR RESOURCE MONITOR
10 TIME INIT - CREATE MODIFY TIME INITIATED ACTIONS
11 LOG CONFIG - CREATE MODIFY LOG LOCATION CONFIGURATION
12 IMS MTO - STANDARD IMS MTO SCREEN
X EXIT - TERMINATE IMF/SYSTEM MANAGER

DATE - 83/02/07
TIME - 16:14
JUL DATE - 83.030

```

PRESS END KEY TO TERMINATE IMS MANAGEMENT FACILITIES

IMF/SYSTEM MANAGER™ provides a high-level, menu-oriented IMS operator interface for increased MTO productivity; automatically performs routine operations; and implements the corrective actions proposed by the IMF/SYSTEM EVALUATOR.

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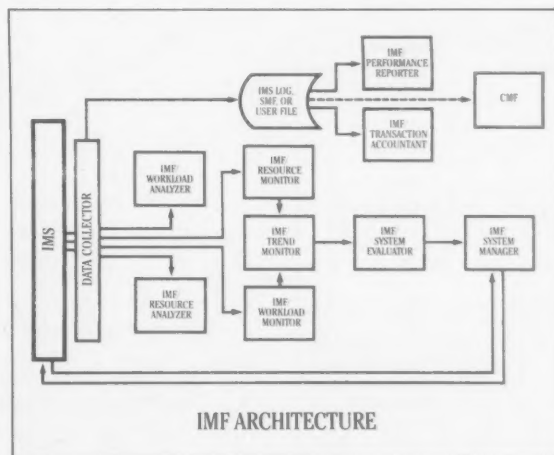
Off-line, IMF allows you to create a complete picture of historical data center performance for corporate management. IMF/PERFORMANCE REPORTER[™] provides system evaluation reports, and plots of activity trends over long spans of time. IMF/TRANSACTION ACCOUNTANT[™] is the *only* transaction-based IMS accounting tool for both cost accounting and user charge-back. And to extend management control far into the future, IMF integrates with our new CAPACITY MANAGEMENT FACILITIES (CMF)[™], a complete MVS planning system which allows data center expansion to be precisely tailored to projected workload growth.

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Boole & Babbage

NEW VISIONS IN SYSTEMS MANAGEMENT

Almond Growers Find Time Ripe for WP System

SACRAMENTO, Calif. — Ask any member of the 5,000-member California Almond Growers Exchange to describe the exchange's computer system in one word and that word might be "consolidation." The Exchange recently provided uniform access to its central library, saved typesetting costs and freed disk space when it consolidated its word processing needs around a single vendor.

Producing miscellaneous correspondence, generating reports, communicating with farmers and markets and tracking production required more modern methodology than the typewriter could provide, so individual departments within the exchange installed a variety of word processors. But, according to Stan Deam, director of technical services, this did not prove to be a satisfactory arrangement.

"There was a demand for additional word processors," he said. "And the company felt we should do something on a corporate basis rather than continue adding vendors and having separate maintenance agreements. We wanted a system that would let everybody communicate to a central library."

Prior to purchasing a system, the exchange conducted a survey to determine the number of hours each person felt he had spent in performing a particular job. A committee was subsequently formed and spent six months checking out various equipment, finally narrowing the choice to three vendors: Lanier Business Products, Inc., A.M. Jacquard and Wang Laboratories, Inc.

Easy to Learn

"We went with Wang because it's such an easy system to learn," Deam reported. "And we liked the glossary feature. But probably the deciding factor was that we wanted a system that we could put a lot more devices on. We could expand it. Some of the other systems were limited in the number of workstations."

The exchange installed the Wang OIS 140 with 10 workstations and

seven printers. They are used by the communications department, the president's office, plant production, data processing, gift pack office and marketing.

The exchange produces a number of publications. The communications department enters all magazine copy on the Wang system and sends the disk to a local printer, where it is converted to typeset copy. This new process eliminates the need for a professional typesetter, saves time and reduces overall production costs.

The exchange is using Wang's basic word processing package. "With the Wang word processor, we have a dedicated software package that is doing one job," Deam said. "We are not running it as a data processor, al-

though the software is available to do that, too."

Deam is particularly happy with the archival system that Wang provides. "To prevent using all the available disk spaces, we remove documents that are not required for maybe six months or a year," he said. "At some time we may want them again, but we don't know when. So we can clear them out of the libraries, and that disk space can be reused."

"It's an ideal method for reserving disk space. The way the Wang software is set up, we just give each of the libraries a name or a code and we can retrieve what we want. If one of the operators needs a document, he or she sends us a form, we load that back into the library maintained for

that department and they have it."

The exchange's word processing system is used by two groups: the data processing people who handle the disk backup and archiving and the personnel at various other departments who use the system. If one of the users has a question, the DP department assists him. When necessary, the DP department calls the Wang office here for assistance.

Deam feels the Wang integrated system is working extremely well for the California Almond Growers Exchange. "I like the concept of having a single system for the entire company," he stated. "When we buy additional word processors, they will be Wang models that can tie into this system."

OH WHAT A YOU WEAVE.



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MJCC Meeting Set for May 11

BLOOMINGTON, Minn. — The fifth annual Minnesota Joint Computer Conference (MJCC) is slated to take place here May 11-12. The event is being cosponsored by the Association for Computing Machinery, the Association for Systems Management and the Data Processing Management Association.

The theme of the conference is "Strategies for the New Wave." Sessions will concentrate on management techniques, personal growth strategies, technological strategies and evolutionary strategies, according to show sponsors. Keynoting the meeting will be the director of educational programming at ITT, Thomas D. Lutz.

Registration for the conference is \$215. Further details may be obtained from MJCC headquarters through P.O. Box 9544, Minneapolis, Minn. 55440.

Sponsored by IACSS, Data Security Workshops

Data Security Workshop Slated March 28

WASHINGTON, D.C. — The 51st International Operations Data Security Workshop will be held here March 28-31. The workshop will be sponsored by the International Association for Computer Systems Security, Inc. (IACSS) and Data Security Workshops, Inc.

Nineteen sessions will cover a range of technical and administrative controls dealing with the security problems of distributed processing, computer facilities support, communications security, personnel controls, backup and recovery contingency planning, logical and physical access controls of programs and data, establishing auditable operation controls and risk analysis.

In addition, details of the two-part Computer Systems Security Professional certification program and the establishment of a Capital Region Chapter of the IACSS will be highlighted.

The workshop costs \$775 for IACSS members and \$825 for non-members.

More information is available from IACSS at 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

Independent Service Firms Profiled

PALMYRA, N.J. — Service Research Group has published the "Handbook of Independent Service Companies," containing profiles of over 250 independent service companies and providing guidelines for evaluation and selection.

Information provided includes staff and revenue size, businesses served, equipment serviced, software and communications capabilities, geographic coverage and contract terms and rates, a spokesman said. The book also features a geographic/service index.

The handbook costs \$1,500 from Service Research Group, P.O. Box 335, Palmyra, N.J. 08065.

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Spring Seminars Set to Discuss Net Protocols

MADISON, N.J. — The American Institute for Professional Education here is presenting a three-day seminar on "Network Protocols" in San Francisco, March 23-25; Rochester, N.Y., April 6-8; Boston, April 13-15; Minneapolis, April 20-22; Detroit, April 27-29; and Dallas, May 4-6.

Covered will be "Communications Network Fundamentals," "Communications Standards" and "the ISO [International Standards Organization] Reference Model."

Registration costs \$765, with a 10% discount for three or more registrations made concurrently by the same firm. The institute is located at the Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

DPMA to Hold AI Conference

TORRANCE, Calif. — The Education Foundation of the Data Processing Management Association (DPMA) is sponsoring a conference on artificial intelligence (AI) in Boston, April 14-15 and then in Washington, D.C., April 28-29.

The conference is intended for aerospace and electronics companies that will be affected by the AI revolution, according to a DPMA spokesman. Areas to be covered during the two-day event include the hardware/software technologies and architectural techniques involved in AI, the Department of Defense's current activities and future plans for AI, how industry can participate, the status of Japan's fifth-generation computer project and ways in which a practical AI project can be implemented.

Registration for the AI conference is \$475. Further details can be obtained from the Education Foundation of the DPMA, Department AI, 3420 Kashiva St., P.O. Box 3608, Torrance, Calif. 90510.

AI Focus of Forum For August Meet

WASHINGTON, D.C. — Artificial intelligence will be the focus of a week-long meeting here August 22-26. It is being jointly sponsored by the American Association for Artificial Intelligence (AAAI), the University of Maryland and George Washington University.

Computer scientists, linguists and related researchers will assemble at this forum to present their views and findings on the subject of artificial intelligence. A concurrent exhibit will feature the latest in hardware and software of interest to the computer science research community, according to conference sponsors.

Registration for this event is set at \$90 for AAAI members and \$125 for others. Further details are available from AAAI, 445 Burgess Drive, Menlo Park, Calif. 94025.

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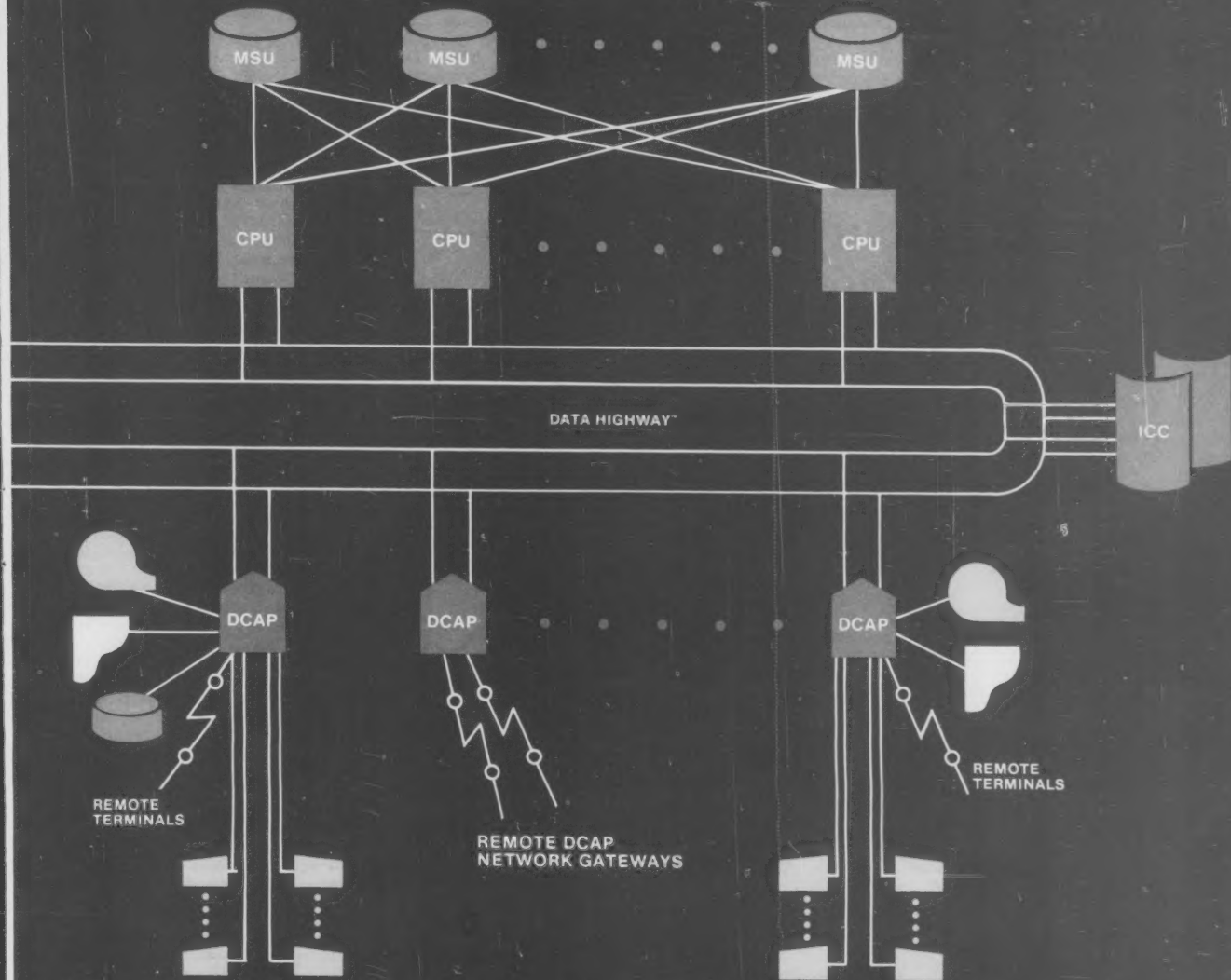
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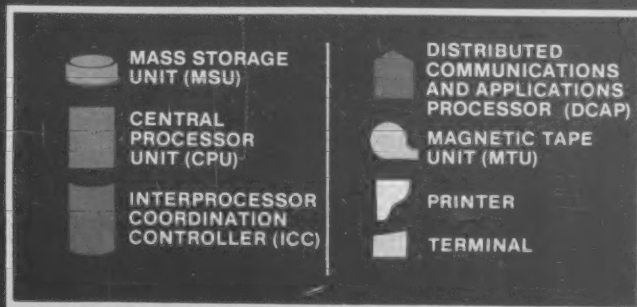
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Calendar

Week of March 20

March 21-23, Washington, D.C. — **Office Automation: Concepts, Systems and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 25, Cleveland — **Computer Law Institute.** Contact: Bar Association of Greater Cleveland, Mall Building, Cleveland, Ohio 44115.

Week of March 27

March 28-29, Washington, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

March 28-30, Summit, N.J. — **Data Processing for the Non-DP Execu-**

tive. Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

March 28-30, Tampa, Fla. — **Computer Security and Disaster Recovery Planning.** Contact: Nancy DeMatteo, Registrar, HSH National Management, Inc., Suite 215, 150 E. Wilson Bridge Road, Worthington, Ohio 43085.

March 28-31, Washington, D.C. — **51st International Operational Data Security Workshop.** Contact: International Association for Computer Systems Security, Inc., 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

March 28-April 1, San Francisco — **ACE Professional Development Week.** Contact: Association for Computing Machinery, 969 Dolores St.,

San Francisco, Calif. 94110.

March 28-April 1, San Francisco — **Advanced Vsam.** Contact: Ellen Garfield, Software Education Corp., 1114 Ave. of the Americas, New York, N.Y. 10036.

March 29, Dallas — **Personal Computer Software Industry Forum '83.** Contact: Future Computing, Inc., 900 Canyon Creek Center, Richardson, Texas 75080.

March 29-30, Madison, Wis. — **Optical Storage of Information.** Contact: Francis P. Drake, Department of Engineering & Applied Sciences, University of Wisconsin — Extension, 432 N. Lake St., Madison, Wis. 53706.

March 29-31, New Orleans — **SAS Basics Course.** Contact: SAS Insti-

tute, Inc., P.O. Box 8000, Cary, N.C. 27511.

March 30-31, Washington, D.C. — **Shared Information Management: Effective Means of Defining User/DP Roles.** Contact: Peggie Garre, Boeing Computer Services Co., Education and Training Division, P.O. Box 24346, Mail Stop 9A-90, Seattle, Wash. 98124.

Week of April 3

April 4-5, Boston — **How to Use Desktop Computers in the Professional Design Firm.** Contact: Terri Connell Management Associates, Inc., 1145 Gaskins Road, Richmond, Va. 23233.

April 4-6, Washington, D.C. — **Data Dictionaries: Concepts, Contents and Uses.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

April 4-6, New York — **Job Control Language.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

April 4-8, Kansas City, Mo. — **Systems Analysis Workshop.** Contact: Bill Schoonmaker, Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

April 4-8, Santa Clara, Calif. — **MVS Diagnostics Techniques.** Contact: Amdahl Education Center, 1250 E. Arques Ave., M/S 302, Sunnyvale, Calif. 94086.

April 4-15, Chicago — **MVS System Fundamentals.** Contact: Amdahl Education Center, 1250 E. Arques Ave., M/S 302, Sunnyvale, Calif. 94086.

April 4-15, Santa Clara, Calif. — **CP Internals.** Contact: Amdahl Education Center, 1250 E. Arques Ave., M/S 302, Sunnyvale, Calif. 94086.

April 5-6, New York — **Local Networks: Promise Into Practice.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

April 5-6, San Diego — **International Symposium on Automated Integrated Manufacturing.** Contact: Leonard B. Gardner, 2406 Butte-top Place, Spring Valley, Calif. 92078.

April 5-7, San Francisco — **Optical Storage Technology Management.** Contact: Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114.

April 5-7, Columbus, Ohio — **CBT Courseware Design.** Contact: Educa-

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Calendar

tion Coordinator, Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

April 5-7, Salt Lake City, Utah — **Jovial-Ada Users Group**. Contact: Paul C. Wood, Sperry Computer Systems, Defense Systems Division, P.O. Box 43525, M.S. U2P14, St. Paul, Minn. 55164.

April 5, Washington, D.C. — **Designing VLSI**. Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

April 5-8, Las Vegas — **EFT Expo**. Contact: Electronics Funds Transfer Association, Suite 800, 1209 Vermont Ave. N.W., Washington, D.C. 20005.

April 5-8, New York — **Computer Culture**. Contact: Conference Department, New York Academy of Sciences, 2 E. 63rd St., New York, N.Y. 10021.

April 5-8, San Diego — **Digital Communications**. Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

April 5-8, Tokyo — **Communications Tokyo '83**. Contact: Clapp & Poliak International, P.O. Box 70007, Washington, D.C. 20088.

April 5-8, Washington, D.C. — **Computers/Graphics in the Building Process**. Contact: World Computer Graphics Association, Inc., Suite 250, 2033 M St. N.W., Washington, D.C. 20036.

April 4-8, Vancouver, B.C. — **James Martin Seminar — Productivity**. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 5-13, Columbia, Md. — **ACF/Vtam**. Contact: Amdahl Education Center, 1250 E. Arques Ave., M/S 302, Sunnyvale, Calif. 94086.

April 6-8, Phoenix — **Network Communications Protocols**. Contact: Center for Advanced Professional Education, Inc., 11928 N. Earham, Orange, Calif. 92696.

April 7, Palo Alto, Calif. — **California Computer Show**. Contact: Norm DeNardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

April 7-8, Minneapolis — **Software: A Legal Briefing for EDP Professionals**. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

April 7-8, Washington, D.C. — **Data Administration: Development and Practice**. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

April 7-8, Newport Beach, Calif. — **Digital Communications Seminar**. Contact: Technology Transfer Society Seminars, Department Digcom, P.O. Box 3608, Torrance, Calif. 90510.

April 7-8, Boston — **Unix System Administration**. Contact: Institute for Advanced Professional Studies, 55 Wheeler St., Cambridge, Mass. 02138.

April 7-8, Washington, D.C. — **Local Networks: Promise Into Practice**. Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

April 7-8, San Diego — **VAX/11 Basic Professional Seminar**. Contact:

Digital Data Dialog, Suite 101, 609 S. Escondido Blvd., Escondido, Calif. 92025.

April 8-9, Concord, N.H. — **Computers in Education**. Contact: Anne Knight, Computer Services, Stoke Hall, University of New Hampshire, Durham, N.H. 03824.

Week of April 10

April 10-13, Boston — **Computer-Based Training Conference**. Contact: Data Training, 176 Federal St., Boston, Mass. 02110.

April 10-13, Miami — **Communications Expo '83**. Contact: Latcom, Inc., 1200 East St., P.O. Box 860, Westwood, Mass. 02090.

April 10-13, Washington, D.C. — **1983 ACM International APL Con-**

ference and Exhibition. Contact: Don Link, STSC, Inc., 2115 E. Jefferson St., Rockville, Md. 20852.

April 10-15, Dallas — **DP Training Managers' Workshop**. Contact: Linda Hubacek, Deltak, Inc., 1751 W. Deihl Road, Naperville, Ill. 60566.

April 11-12, Newport Beach, Calif. — **Digital Communications Seminar**. Contact: Technology Transfer Society Seminars, Department Digcom, P.O. Box 3608, Torrance, Calif. 90510.

April 11-13, Los Angeles — **Improving Automated Payroll Systems**. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

April 11-14, Louisville, Ky. — **Project Management**. Contact: Bill

Schoonmaker, Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

April 11-15, Boston — **James Martin Seminar — Productivity**. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 13-15, San Francisco — **Network Communications Protocols**. Contact: Center for Advanced Professional Education, Inc., 11928 N. Earham, Orange, Calif. 92696.

April 14-15, Minneapolis — **Software: A Legal Briefing for EDP Professionals**. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.



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EDITORIAL

Worth the Risk?

To beta or not to beta? That is the question with which DP managers must wrestle when asked to let their shops serve as test sites for new products. They must decide whether it is nobler to stick with what exists — the proven, established equipment — or to run with an untried product in pursuit of greater glories, like increased efficiency and financial savings.

Do the potential benefits of acting as a test site outweigh the risks? They do if you're prepared to deal with the very real possibility that the project may fail.

The issue of test sites was brought to mind by a recent series of scrimmages with a software financial management package [CW, March 7]. When Software International Corp.'s Fiscal Control/80 package fell short of its promised mark, the company reimbursed the town of Brookline, Mass., as well as the state of Kentucky for their respective inconveniences and then went back to the drawing board with the software. No hard feelings on anyone's part. The governments tried it, they didn't like it, and they got their money back.

In the meantime, the city of Pittsburgh, Pa., was also experiencing some dissatisfaction with Fiscal Control/80. Unlike Brookline and Kentucky, however, Pittsburgh felt so wronged that it would not be content with reimbursement. The city filed a number of breach of contract letters, petitioning the software company and the city's consulting firm to restore the DP dollars that were already sunk into the experiment, plus a few extra hundred thousand dollars to make up for the inconvenience. It won a hefty settlement totaling almost \$1 million.

Why did two test sites let Software International off the hook while another insisted on pursuing the vendor? Our only guess is that a clear definition of "test site" was never agreed upon between the vendor and the city of Pittsburgh.

It seems unfair that Pittsburgh was able to profit from a vendor's mistake when it had willingly assumed the risk for just that possibility. A test site is meant to test the product — not guarantee it.

Perhaps the lesson to be learned here is that vendors should work to describe explicitly what it means to be a test site. Then it's up to the user to decide if it's worth the risk.

DATA PAST

Five Years Ago March 13, 1978

SAN FRANCISCO — A former IBM employee was prepared to tell the jury hearing the Memorex vs. IBM antitrust case that he told IBM's disk drive facility management some of the firm's pricing actions violated the 1956 consent decree against the firm.

The jury never got to hear the testimony, for Judge Samuel Conti deemed the employee too far down the corporate ladder, even though Conti admitted, "[the testimony] could ... swing the whole case in the eyes of that jury."

Ten Years Ago March 14, 1973

CHICAGO — The Computer Foundation, which was scheduled to take over the certification of data processors in July, was thrust further toward an open power struggle in which the Data Processing Management Association and the Association for Computing Machinery squared off against other participating societies, as the two controlling organizations moved to consolidate the powers of their self-appointed cochairmanships.

— — —

Mad magazine came out strongly against the Universal Product Code (UPC). The reason? As *Mad* described it, the UPC looks "yecchy."

WHITE PLAINS, N.Y. — IBM added three models to its 3420 magnetic tape system that records data at the "densest recording capability yet offered," according to a company spokesman.



LETTERS

Free Enterprise Fantasy?

I find the position *Computerworld* took in the editorial "Talk Is Cheap" [CW, Feb. 7] to be a curious stance for a newspaper serving the information processing industry.

I suppose, however, that even in an industry that has caused so much change and will continue to cause change in our society, once positions have been established, the incumbents look for ways to protect their positions through almost any means available, rather than relying on continued success in a competitive environment.

The editorial chided President Reagan for taking a "flight into free enterprise fantasy." After pointing to certain federal subsidies and tax programs that Digital Equipment Corp. used to construct a plant in Massachusetts, the editorial implied that a continuation or expansion of such federal programs is necessary for the continued health of high-technology industries.

Any thorough examination of the facts, either on a microeconomic basis with respect to individual firms or a macroeconomic basis viewing the economy, would lead to the opposite conclusion.

In my business, I frequently assist high-technology corporations in funding their growth.

It is my experience that while such subsidies and/or tax incentives may occasionally alter a decision with respect to location or timing of facilities expansion, they virtually never affect the decision of whether or not to expand.

Furthermore, these incentives are available to a wide range of industries.

With the exception of the recently enacted research and development tax credit, very few incentives are specifically targeted at high-technology industries.

Finally, and perhaps most importantly, economists have found a negative correlation between levels of government involvement — either directly through regulation or otherwise — and industrial-segment growth areas.

At the risk of also taking a "flight into free enterprise fantasy," I suggest *Computerworld* reconsider its editorial position and favor those federal policies — generally passive policies — that enhance the factors most conducive to the technology industry's growth to date.

These policies include the following: low international trade barriers on technology products and services, high rates of capital formation and high levels of competition within the technology industries with respect to customer markets, employees, ideas and capital.

The information processing industry is not immune to general economic conditions, but neither does it need a special set of provided (and, therefore, controlled conditions) for it to flourish.

I suggest *Computerworld* look at the conditions that caused this industry to grow, rather than request the same type of government involvement currently "enjoyed" by the steel and automobile industries in this country.

Jim C. Cowart
Vice-President

Shearson/American Express, Inc.
New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

SOFTLINE/Werner L. Frank†

Singapore Vying for Software Center Stage

Singapore is a small republic occupying about 226 square miles and having no natural resources. The main "product" is the nation's aggressive program for building a major commercial and shipping center based on the free port concept, together with exploiting the intellectual capacity of the population. With respect to the latter, computer software has attracted the attention of the government, which plans to make Singapore the software center of the Asian region.

Singapore's economy struggles to function in the midst of extraordinary contradictory forces. On the one hand, in order to keep pace with the ambitious plans of the federal government to upgrade living standards and achieve economic progress, Singapore has a tremendous need for manpower.

On the other hand, the government has in place a vigorous program designed to limit population growth because of the small size of the republic's territory. Two solutions are being pursued, one for the short term and the second for the long haul.

Guest workers with temporary work permits have been imported from surrounding nations to expand the work force. They also augment Singapore's 2.4 million native population and represent only a short-term solution. The long-range answer for Singapore's hard-pressed

The mission of the National Computer Board is to establish Singapore as a center for computer services, with an emphasis on software development. This focus on computers, and especially software, has encouraged local and foreign entrepreneurs to open dozens of new companies and branches of overseas organizations in pursuit of business.

economy is to multiply productivity of its citizenry, and that is where computers and automation come in.

Computer Education Program

In preparing to support the far-sighted vision of the prime minister, the government recently entered into a major computer education program and placed enormous power and responsibility on the central National Computer Board (NCB).

Education is being tackled from two directions. At the top is the establishment of a number of advanced academic institutions for the promotion of data processing know-how and practice. There is, for example, the Institute of Systems Science, a teaching facility jointly formed and operated by Singapore and IBM. The institute was established to teach computer appreciation and planning courses to senior management and advanced technical courses to experienced DP personnel.

Two other advanced training facilities have been set up, one in cooperation with the Japanese and the other with the British. Both of the institutions were designed to train programmers and systems analysts, but they serve only the present business and professional community.

Secondary Schools

A much deeper and more far-reaching program has been endorsed and put into place for training the next generation of Singaporeans in preparation for an automated society. This is the computer science program under way in the secondary school system for 12-year-old to 14-year-old students.

A two-year course is now in a pilot phase in 30 schools. Singapore has purchased 80 Apple Computer, Inc. Apple II computers, 131 Nippon Electric Co. NEC 8000 devices and 300 Atari 800 systems from Atari Corp. Basic is the language being

taught. In addition, computer clubs are being established throughout the country.

Ultimately, all schools will provide such a program, anticipating the future computer awareness needs of the entire population. The major problem at the moment is the severe shortage of teachers trained in DP.

NCB, constituted in September 1981, is a brand-new factor. Under the leadership of Philip Yeo, NCB was rapidly formed by assigning to it the government's DP civil servants and by recruiting additional personnel from the outside. At present, it is a 240-member organization, representing about 10% of the total DP manpower of a country in which there are already approximately 1,000 computers in the mini and mainframe categories.

These statistics suggest an incredibly low ratio of professionals per CPU, but such a computation is deceptive since a good number of computer installations are with multinational companies whose software is derived from distant parent organizations.

The mission of NCB is to establish Singapore as a center for computer services, with an emphasis on software development. This focus on computers, and especially software, has encouraged local and foreign entrepreneurs to open dozens of new companies and branches of overseas

(Continued on Page 54)

THE DATA CENTER/John P. Murray†

The Question of Whether to Use Graphics

As we went through our planning for the installation and development of an information center within our organization, we struggled with the question of whether we should, as a part of the project, offer anything in terms of graphics capabilities.

We had reservations. The cost of the software and hardware was a factor that we could not ignore. Also, having had no experience with graphics, we felt we would have a somewhat difficult time selling the concept of our management information systems (MIS) clients. After due consideration, we decided that the potential results that could be obtained were worth the risks involved.

While some use of graphics had been in effect in the organization, it was limited, and what was being done was being done by hand. Because of our limited experience with graphics, we felt it would be prudent to introduce the use of graphics on a low-key basis.

Getting Ready

We delayed the introduction of graphics until we had the information center in operation and until we had begun to build our credibility with the information center.

We felt that attempting too much at once, the introduction of both the information center and the use of

graphics, might be detrimental.

The original suggestion that we produce information in a graphic format, even with clients who by that time had experience with the information center and who were enthusiastic about its use, was not met with any sense of excitement. The general feeling was that such information would be nice, but not significantly better than the use of numbers.

We were able to convince several clients to give it a try in order to see what it would do for them. Our first attempts, the first charts and graphs we produced, caused only a moderate response. The feeling was that something was nice, but it was seen as more of a curiosity than anything else.

However, we were able to make more progress and to gain interest in the subject when we included a series of displays that were photographed directly from the color CRT as an integral part of a slide presentation given to an organization's senior management.

Properly photographed, these slides produce a very dramatic impression when incorporated as part of a presentation.

This is even more dramatic when the slides address subjects senior management is familiar with and that they have been used to seeing in

the past as a series of numbers.

Here's a hint for anyone making 35 mm slides from a color CRT: Follow the photographing directions, which can be obtained from the vendor. Make certain the lighting in the room provides the correct contrast. Finally, make absolutely certain that all fingerprints have been removed from the CRT screen. These things may be obvious to people with photographic backgrounds, but as novices, we had to learn the hard way. Done correctly, the results can be dramatic.

Once members of the senior staff began to ask if various types of information could be presented as graphics, the demand for such information began to increase rapidly. Although we do have the facilities to produce 35 mm slides, most of our graphic work is printed on paper.

As people begin to use graphics, the variety of information produced graphically will increase. Once graphic information produced via the computer becomes routine in one or two departments, everyone will want to make use of the facility.

Explaining Unfamiliar Situations

The use of graphics can be very beneficial in explaining situations that are unfamiliar. As most people in MIS know, attempting to explain hardware resource utilization to

non-MIS people, either verbally or through the use of a series of numbers, can be a frustrating and often futile task. Using a graphic display can prove most helpful in putting the message across.

There is another attraction to the use of graphics. When clients are able to produce without assistance their own graphics, there is a real sense of accomplishment. To be able to enter raw data and produce meaningful, attractive graphs without a great deal of MIS mumbo jumbo, is not only an achievement for a client; it helps to present MIS in a positive manner. Anything that helps to improve the MIS image is certainly desirable.

If the question of whether to provide graphics capabilities through the MIS department is being raised in your MIS department or if pressure to do so is being exerted from outside or if it seems as though it might be a good idea only to someone in another department, the idea should be supported and aggressively pursued. The results, provided it is done correctly, will benefit everyone.

Murray is director of MIS for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

HUMAN CONNECTION / Jack Stone†

Can DPers Handle Cyberphobiacs?

If you have not already seen it, dig up *Computerworld Extra!* for Nov. 17, 1982, and read Harold and Elizabeth Guarnieri's mind-blaster, "The Psycho-Computer Syndrome." I cannot recall ever having responded to an article in the trade press in such an emotional way.

On the surface, everything about the article seems correct. The authors appear to have completed a fine piece of research into a very complex and important problem, namely, dealing with the new end users who fear computers — "cyberphobiacs." The authors consolidate their knowledge into insightful conclusions and

This is the first article in a series, "DPers and the Psychocomputer Syndrome," coauthored with Joanne Barker.

come up with a neat description of the transitional mental, emotional and social processes that such users experience. A cool and crisp eight-stage syndrome beginning with "emotional and intellectual insecurity" and ending with "equilibrium [and] a new office routine" is presented.

Nevertheless, I was really upset by

the article, partly by what it said, but more so by what it did not say. I realize that my ideas on the subject are subjective, but they are based on the heuristics of more than a decade of training computer users.

I was troubled by the statement by Prof. Sanford Weinberg of St. Joseph's University in Philadelphia, a presumed authority on the subject, suggesting that "as many as 30% of our population are cyberphobiacs." I flatly reject this projection. Based on my experience, I offer 3% as a more appropriate estimate.

It may be that the difference is only a semantic one, but it nonetheless

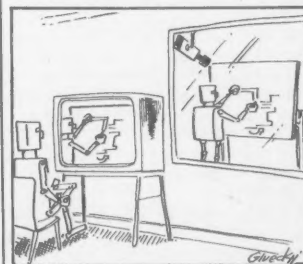
has to be addressed. According to the dictionary, "fear" is "a feeling of uneasiness or apprehension; concern," implying that this is a perfectly normal human reaction. This definition is to be contrasted with the definition of "phobia" which, according to the same authority, is "an irrational, excessive and persistent fear of some particular thing or situation," and is generally considered to be an abnormal human reaction or psychological disorder.

'Fearful' Users?

Perhaps Weinberg meant that many new users are *fearful* of the advent of computerization, wherein the fears are derived from a *rational* set of circumstances and should not be attributed to psychological disorders any more than the fears encountered by most of us while learning to drive cars or to ski should be attributed to neuroses. Such fears, it seems to me, can indeed be handled by DPers in ways that are analogous to those used by driving and skiing instructors.

But it just does not seem reasonable to me that three out of every 10 new users possess "irrational, excessive and persistent fears" of the impending drop-off of terminals on their desks. Maybe Weinberg was suggesting that many new users should be classified as neurotic before the announcement of an automation program. In this case, the users are already burdened with the myriad personal, social and political pressures of business life, and thoughts of having to deal with computing machinery only accentuate hostile attitudes.

If this latter assessment is anywhere near correct, operational instabilities in user departments would be far worse than they are and information system managers would be pushed into the role of pseudopsychiatrists in order to implement systems. But answer this one for me: Is a DPer the kind of person you want to treat your neurosis?



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READER COMMENTARY/Bud Stoddard†

Are You Ready for a Data Center Disaster?

As I meet with front-line managers of major manufacturing, financial and service organizations each day, it both amazes and disturbs me that there has been such little planning and, more importantly, such little implementation done with respect to disaster readiness.

Virtually every major corporation today has a preeminent dependency on data processing. That dependency is so great that the loss of computer uptime or the destruction of programs, documentation or data files would cripple the organization temporarily and, perhaps, permanently.

Imagine the ramifications of not being able to process data for just five working days in your company. Manufacturing resource planning stops and, ultimately, manufacturing. The purchase order system halts and you cannot order parts, supplies and inventory. Cash management becomes nonexistent. Accounts payable cannot pay vendors, and worst of all, billing and accounts receivable stop and employees face a payless payday.

To suggest that these critical functions could be continued manually in a multimillion dollar company is, I think, a totally naive position to take, particularly during a time of disaster. In such a situation, the organization would be in total disarray, and most of the staff would be in trauma. You cannot expect personnel to function normally when disaster strikes.

Disaster Takes Many Forms

Make no mistake, it *can* happen, and it *will* happen. Perhaps the computer center will not burn to the ground or a militant group will not plant a bomb in the data center, but a disaster can take many forms.

Think of a disaster as anything that forces you to stop processing for two hours or more (in some industries, such as medicine and banking, substantially less than two hours). A disgruntled employee, upon being dismissed, will steal data or mislabel backup tapes. There will be another Blizzard of '78. Extreme temperature or a dirty disk pack will cause a head crash. A new programmer will inadvertently write over a critical tape.

These incidents do happen every day; they just are not publicized. After all, if you experienced a small disaster tomorrow morning you would, no doubt, keep it as quiet as possible. During a disaster, customers lose confidence vendors are afraid that they will not be paid, employees get nervous and top management gets angry. Also, headhunters come after your most valued DP staff members during a time of disaster.

Disaster Readiness Is a Need

Disaster readiness is a basic management responsibility, and the first thing to do is to realize that disaster readiness is a need.

Next, sell the importance of disaster readiness to top management. Get top management to commit resources, personnel and funds so that you can tackle the problem head on. Make top management realize disaster readiness is not something you

can put off until the economy improves.

Next, conduct some sort of risk analysis to assess the damage of being without processing for a day, a week or a month. If you have people on staff who perform this function, gain their support. Meet with internal and external auditors. Ask the treasurer or controller the effects of not billing or collecting receivables for 10 days. Ask the payroll supervisor about the effects of not being able to print checks for your next payday.

In addition, make plans. Create a written game plan of what to do in the event of a disaster. The plan

should address everything you do until normal operations are resumed. Some of the issues to be included are:

- A detailed account of emergency procedures.
- Advance identification of critical applications.
- A provision for alternative sources for each critical resource.
- A detailed analysis of needed personnel, plant, communications ability, hardware, supplies, forms and, most importantly, data (files, procedures and documentation).
- A detailed disaster organizational chart with all appropriate job descriptions.

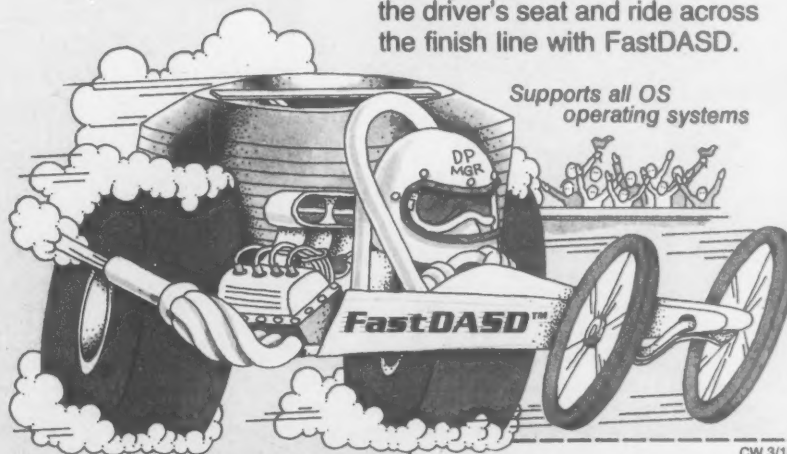
In short, the written plan should be a detailed blueprint of every step between the time disaster strikes and the time normal, ongoing operations are resumed. Also, the document should be so comprehensive that a total stranger (technically proficient, of course) could bring you backup using nothing but the detailed plan.

Next, secure an off-site vault for documentation and data storage *now*. Eighty percent of loss, destruction, sabotage and theft is perpetrated by employees.

The next step is to make a written reciprocity agreement with a compa-

(Continued on Page 52)

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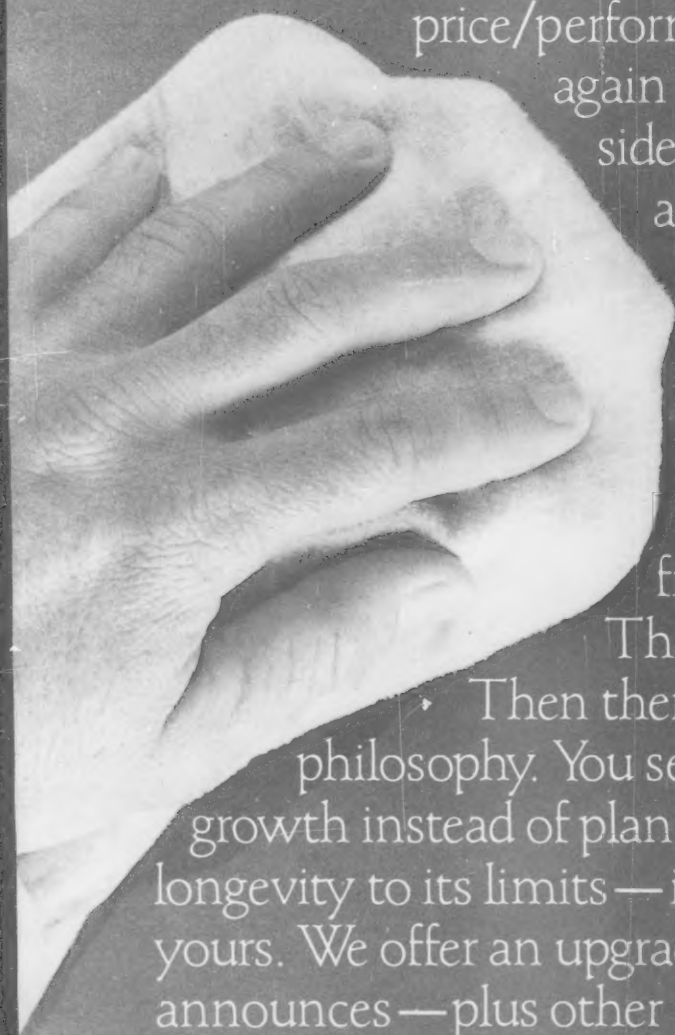
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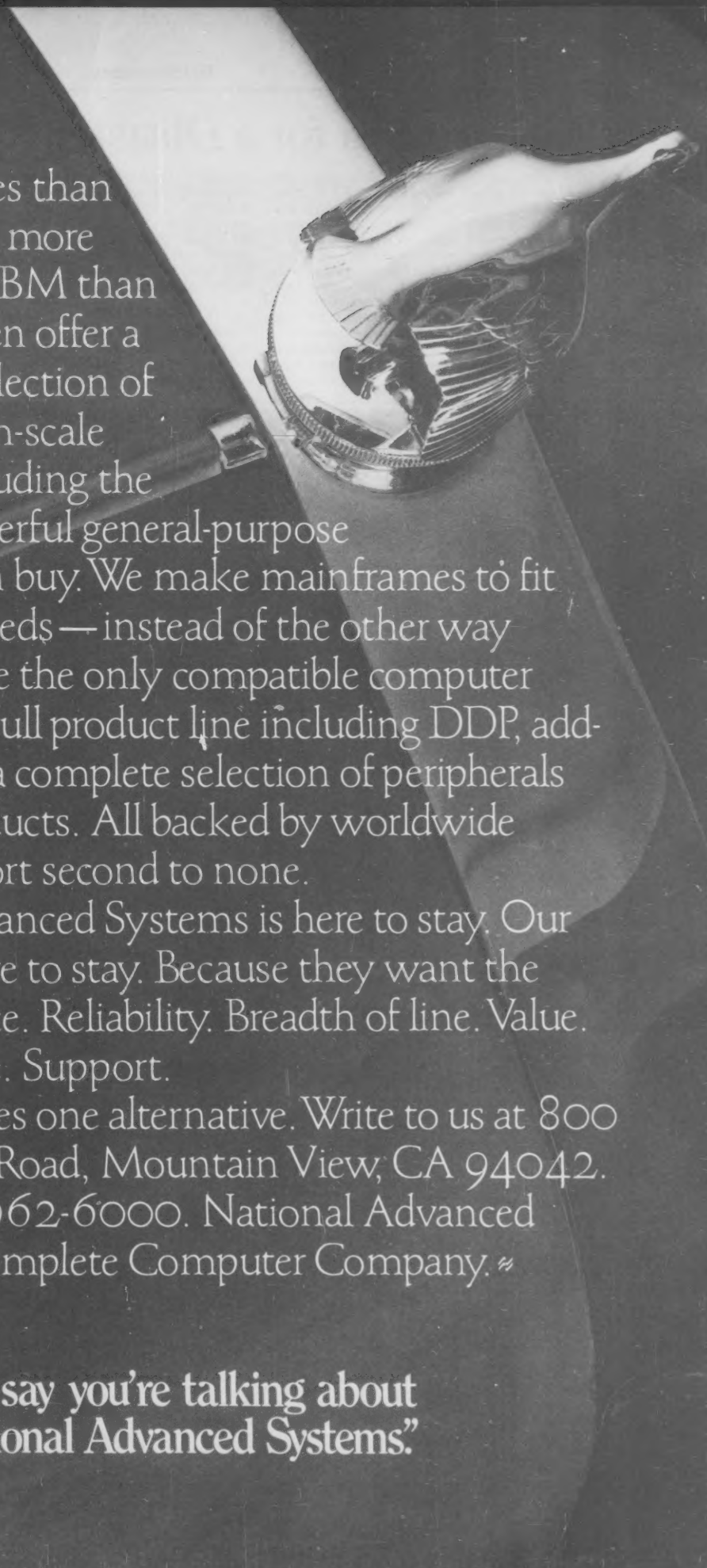
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A black and white photograph showing a car headlight and a pen resting on a document. The headlight is on the right, angled towards the left. The pen is on the left, angled towards the right. They are positioned diagonally across the frame, with the document they rest on having some faint, illegible text visible.

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Prescription for a Disaster Readiness Plan

(Continued from Page 49)
ny that has a similar equipment configuration and communications ability. However, a reciprocity agreement of and by itself is not sufficient backup for hardware replacement. This option is only of value in short-term situations and when it supplements additional backup capability.

There are two problems inherent in a reciprocity

agreement. The first is that the firm providing reciprocity may be at such a high level of utilization that it cannot afford your support when disaster strikes.

The second is that all management information systems departments are in a state of change, and your shop and the reciprocal shop may no longer be compatible when the need arises. A commercial backup site will un-

doubtedly keep pace with your evolution more than a reciprocal company. Reciprocity serves a functional role in the disaster recovery process, but it must be supplemented with additional backup capability.

A Backup Facility

Next, contract for a backup facility. There are two principal types, a shell site and a hot site. Ideally, the

backup center should be 25 to 50 miles away.

A hot site is the optimal solution. This is a data center which, as much as possible, mirrors your own. A shell is the same thing with one important difference: It does not contain hardware.

Once you have gone through the above steps, create a disaster (not a trail run or a test) and see if all this works. Do not tell anyone

(except maybe your boss or the president) this disaster is not real. If your staff knows it is not the real thing, the results will not be there. When it is over evaluate, fine tune and test some more.

Finally, do not store the disaster plan in the computer room.

By this time, you are probably thinking this sounds like a lot of work, work you just cannot afford to do. The facts are, you cannot afford not to do it.

Stoddard is president of Datavault Corp., located in Needham Heights, Mass.

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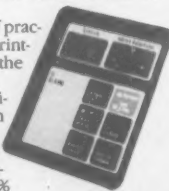
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Withholding doesn't solve a compliance problem on your bank account interest, which banks have been reporting for years. Withholding solves a compliance problem on savings bonds because traditionally no records have been kept.

It would be ironic if the "remedy" of withholding not only killed the savings bond, but also crippled the savings account through disincentive to save, while sticking the banking industry for the cost of the weapon.

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Research Tax Credit

I would like to emphasize the importance of "Software R&D Tax Credit Rocky" [CW, Feb. 21] concerning the availability of the 25% research tax credit to the software industry. The availability of the research tax credit

for companies engaged in software development will be severely restricted if regulations proposed by the Internal Revenue Service are

not substantially modified.

The problem as it relates to software developers lies in the definition of which expenses will qualify for the

credit. Under the IRS' approach, the research credit would be allowed only for costs where the operational feasibility of developing the software is in serious doubt.

A more productive approach for the IRS to adopt is for it to allow all software development costs to qualify for the research credit. This standard would replace the "operational feasibility" and "significant risk" tests with one that provides appropriate incentives for new software development. Under this definition, the IRS

would still be free to exclude costs incurred for minor adaptations to existing software where there was not some reasonable level of development effort expended.

The regulations as now issued are only in proposed form. As such, it is very important for firms engaged in software development to submit comments to the Treasury Department before the regulations are finally adopted; comments must be submitted before March 25, 1983. I intend to submit comments about the impact of the proposed regulations on software developers.

George J. Yost
Coopers & Lybrand
Boston, Mass.

Singapore Vying for Software Lead

(Continued from Page 47)
organizations in pursuit of business.

Conflict of Interest

NCB is not entirely uncontroversial. Such a governmental organization can have potential conflicts of interest when serving in both policy-making and executive modes.

Indeed, such a case has recently emerged wherein the commercial interests of software companies were threatened by the NCB chairman's statement that "NCB is the sole consultant, buyer of hardware and software and implementing agency." The implication was that all of the government's custom

and turnkey software requirements would be met by the in-house staff.

But the same organization is now marshaling an important program for developing a software industry as part of the Science Park to be established in a specially selected area near the University of Singapore.

Financial Incentives

Financial incentives are being formulated to induce overseas organizations to set up software creation and production facilities in Singapore beginning in 1983. However, it should be clear to those interested that the motive is to create a software export business rather than

to supply markets in Singapore alone.

If the past progress and determination of Singapore's government are any indication at all, we can expect that the objective of making the area a software center will indeed be realized.

But Singaporeans should be aware of one thing: Software innovation is not something that results from governmental decree. Rather, it springs spontaneously from the brains of human beings who are rich in hands-on application-oriented experience.

Frank is an independent consultant and president of the W.L. Frank Computer Group located in Calabasas, Calif.

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In addition to the OA Focus, *Computerworld OA* will have a variety of OA articles on such subjects as communications costs, E-Com, and portable computers.

In every issue of *Computerworld OA*, you'll find articles on what's happening in all aspects of office automation. We'll keep you current on new technologies and trends while taking a closer look at key issue in our special section, OA Focus.

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Useful if Chosen Carefully Ask Questions Before Jumping Into T/S

By Stuart Hoffman
Special to CW†

The computer time-sharing industry has always existed under a cloud of suspicion nurtured by a few unscrupulous

vendors. Nevertheless, the industry has flourished.

Time-sharing's secret has been learning to adapt. Users no longer require "raw time" on mainframes, so the industry

in recent years has turned to providing data base and network services not available elsewhere.

If chosen and used thoughtfully, a time-sharing service can be a useful tool to businesses that need complex applications, but lack the time or resources to develop them in-house. However, a business considering time-sharing should be prepared to ask a few questions of prospective vendors.

Do I need a mainframe? While many applications still require a mainframe's speed and storage, enough noncritical applications exist to make it a good practice to check out the feasibility of running with a mini or micro.

What kind of support is available to me? Beware the one- or

two-person sales office. They may be too busy hustling new business to have time to sit down and help you with your problems. Seek out a firm with a suitable ratio of support to salespeople at the branch office. There should be three programmer/analysts for each marketing representative.

Can I eventually take my software in-house? Many time-sharing firms will go out of their way to write an application system in their own proprietary languages. The result is that you are left with a system that will only run on that vendor's system.

Use only languages, packages and subroutines that are available on a purchase as well as a lease basis.

(Continued on Page 62)

Monitor Analyzes Vsam Performance

ROCKY HILL, Conn. — Software Technologies and Research, Inc. has announced an IBM Vsam Space Utilization Monitor (Vsum) designed to assist Vsam users with performance analysis and disk space management.

Vsum is said to analyze Vsam performance via actual data set interrogation coupled with catalog analysis. The Vsum reports provide graphics and statistical information on any Vsam file at the control-interval, control-area and data set level, the vendor said. In addition, the software will make performance recommendations as to control-interval size, buffer space requirements, data set reorganization and an indication that control-area splits are impossible.

The package reportedly provides users with processing options designed to allow control of report genera-

tion and statistical file creation. With these input options, reports are optional and can be rerun without reprocessing the Vsam data set, the vendor noted. Reports can be generated based on the complete data set, key ranges, control-area numbers, control-area sampling and volume selections. Statistical file options allow users to save the report statistics for historical reasons and reprint Vsum reports.

Reports included in the package include a data set report, performance recommendations, a control-interval report, a control-area report, a control-area graph and a key-range report.

The Vsum package costs \$2,500, which includes the first year's maintenance. It is available for a free 30-day trial, the vendor said from 41 New Britain Ave., Rocky Hill, Conn. 06067.

'SMM/Tracs' Gets Update

SACRAMENTO, Calif. — Software Module Marketing Corp. has announced Release 1.6 of SMM/Tracs, a package that reportedly facilitates batch data transfer between unlike binary synchronous processors.

Designed primarily for CPUs using either IBM's DOS- or OS-oriented systems software, Re-

lease 1.6 includes multiple-line turnarounds in a single session and a full transparency mode that allows transmission of packed or binary data.

Available April 1, Release 1.6 costs \$5,500 for the DOS version; \$8,000 for the OS type, from SMM at 1007 Seventh St., Sacramento, Calif. 95814.

MARLBORO, N.J. — The Software Products Group of CGA Computer Associates, Inc. has released Version 7.0 of Single Image Software, formerly known as the Transparent Single System Image.

The software is comprised of three modules designed to maximize the productivity of multiple processors in a single environment. They include Super Multiple Systems Integrity facility, Global Console Director and Multiple Systems Manager. They enable consoles physically attached to any system to be logically connected to any other system in the complex, according to a vendor spokesman.

The package runs on IBM's SVS, MVT, VS1, MVS Base, MFT, MVS/SE1, MVS/SP1.1 and MVS/SP1.3 operating systems and costs \$1,525 per site

per month. CGA is located at Cannon Hill Farm, 255 Rt. 520 E., Marlboro, N.J. 07746.

OSI Service Targets Vsam

FORT LEE, N.J. — On-Line Software International, Inc.'s (OSI) IBM CICS Standards and Guidelines Development Service now includes a section on Vsam guidelines to detail Vsam, its structure, proper design and performance optimization.

In its introductory Vsam section, OSI defines the access method, the kinds of data sets used with Vsam and the advantages and disadvantages.

The entire service costs \$19,000 from Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

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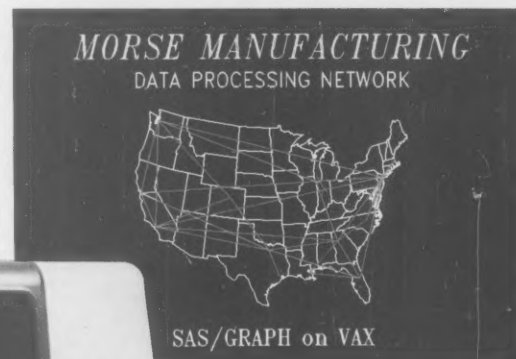
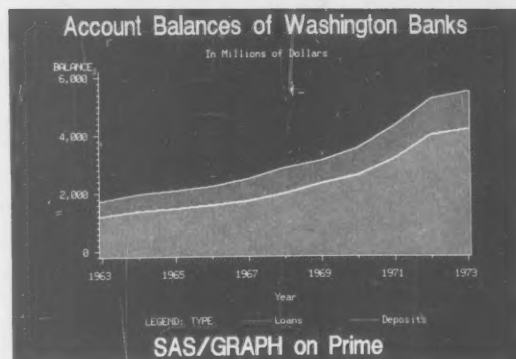
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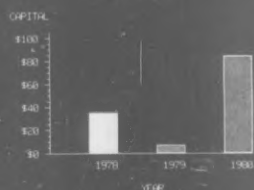
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'Statgraphics' APL-Based, Targets IBM

PRINCETON, N.J. — Statistical Graphics Corp. has announced Statgraphics, an interactive statistical graphics system written in APL and designed for IBM 370, 30, 3081 and 4300 series machines.

A spokesman said the system consists of 24 chapters containing over 200 user-documented APL functions, which can be used individually, integrated into other user-written functions or executed under the control of full-screen menus.

Features include use of screen fields for data input and option selection, direct access to graphics primitives, use of screen panels and programmed function keys to control execution and generate graphics and a split-screen feature allowing multiple plots on a single screen.

The package costs \$3,800 for the first year with a \$1,900 annual renewal fee. Educational institutions pay \$1,900 for the first year, with a \$950 annual renewal fee. The company can be reached through P.O. Box 1558, Princeton, N.J. 08540.

HP 250 Users Get Packages

FOREST HILL, Md. — File modification, security and payroll packages for Hewlett-Packard Co. HP 250 users have been unveiled by Maryland Computer Services, Inc.

File Modification (Fmod) reportedly allows quick changes, which are then displayed on the screen to show a history of changes prior to updating the directory. Fmod costs \$495 or \$25/mo.

Secure features four combinable protection options: protected lines of code, erased program comments, erased program symbol table and an option to make run-only programs. Secure costs \$495 or \$15/mo.

The Payroll Software Package features user-defined tax tables, management reports, the ability to handle salaried/hourly employees and the ability to handle an unlimited number of deductions.

The package costs \$1,500 for the first copy, \$1,000 for each subsequent copy or an unlimited license for \$10,000. Demonstration disks cost \$150. Rental is available for \$25/mo for the first copy and \$10/mo for subsequent copies.

The firm is located at 2010 Rock Spring Road, Forest Hill, Md. 21050.

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Retrieval, Presentation Aid Debuts for IBM System/38

MILL VALLEY, Calif. — Fusion Products International has introduced Fusion 4/38, an information retrieval and presentation package for IBM's System/38.

Fusion 4/38 was designed to allow nontechnical users to extract and produce professional-quality reports from data resident in their computer system. The software is menu-driven and can perform mathematical calculations, custom document formatting and can be interfaced to a variety of output devices, including laser printers and 198-col. line printers.

The package includes a data dictionary that works in concert with the System/38's own data management functions to control and provide access to any piece of information defined to the system, the vendor said.

In addition to the definition, the dictionary stores a standard heading for the element, its decimal alignment and its standard display format.

Fusion 4/38 is said to be fully interactive and to pro-

vide full-screen format capabilities. Available immediately, it is priced at \$5,000 in single-order quantities.

The vendor is located at 317 Miller Ave., Mill Valley, Calif. 94941.

Tymlabs Offers 'Look/3000'

AUSTIN, Texas — Tymlabs Corp. has announced Look/3000, an application profile generator for the Hewlett-Packard Co. HP 3000 computer.

The product, which was developed by Wick Hill Associates, Ltd. of England, re-

portedly allows observation of a program as it is being executed, pointing users to areas of greatest potential time saving.

The new procedures are

portedly allows observation of a program as it is being executed, pointing users to areas of greatest potential time saving.

The Look/3000 generator costs \$4,000 from Tymlabs at 211 E. 7th St., Austin, Texas 78701.

T/S Useful, But Beware

(Continued from Page 57)

If I take a system in-house, will I continue to get support? Just as users become dependent on software, they may require the services of the programmer down the road. However, some time-sharing firms want you to work on their hardware or not work with them at all. In that case, find somebody else.

Will the time-sharing firm customize my software? The

firm that only sells you off-the-shelf software may present obstacles when requirements for those "slight changes" come pouring in.

Does the company stick to only one manufacturer of hardware? We all have our favorites, but no hardware is best for every application.

Hoffman is an account executive with Goldata Computer Services, Inc., in Bryn Mawr, Pa.

Data Analysis System Gets Enhanced

BOULDER, Colo. — American Research Corp. has added four new data analysis procedures and a file interface program to its version of the SPSS, Inc. Data Analysis System for users on Tandem Computer, Inc. processors.

The new procedures are

Logit Model, Cox Model, Cox Time and Kaplan Meier. Logit Model allows the users to determine survival rates using historical data. Cox Model is a procedure for analyzing time data arising from proportional hazards. Cox Time is an analysis tool for analyzing failure-time data using fixed co-variables. Kaplan Meier is used to describe and compare distributions of failure times.

A spokesman said the tools can be used in applications involving life cycles, product and process life expectancies, risk and hazard analysis and the calculation

of survival rates.

The procedures are included in SPSS data, an interface program for users working with Tandem's Data Definition Language and its Enform report generator language. The program generates an executable SPSS instruction file through a one-line command.

American Research Corp.'s SPSS Data Analysis System costs \$20,000 with a \$5,000 yearly renewal fee. Additional nodes costs \$1,000 for the first year and \$500 for subsequent years from 4465 Grinnell Ave., Boulder, Colo. 80303.

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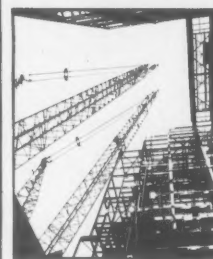
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Additional Attendee Names _____

Three Utility Programs Out For Large Burroughs Users

JACKSONVILLE, Fla. — Jacksonville Software Services, Inc. has announced three utility programs for Burroughs Corp. large systems users.

Intersort reportedly enables the user to sort any disk file by entering parameters at a video terminal. Sorts can be accomplished on up to nine keys. It costs \$695.

Interquery is said to allow the user to examine and modify data in any selected disk file. Data can be specified for video terminal display in display or hexadecimal

formats as specified. Interquery costs \$695.

Cryptolock is a file encryption system priced at \$1,295 from the firm at Suite 234, 7555 Beach Blvd., Jacksonville, Fla. 32216.

'Tell-A-Graf' Adds 32-Bit Versions

SAN DIEGO — Integrated Software Systems Corp. has announced the addition of three 32-bit minicomputers to the family of machines upon which the company's Tell-A-Graf and Disspla

CHICAGO — SMS Management Systems has announced the Human Resources Management System (HRMS), an on-line package for the Sperry Univac 1100

series.

HRMS maintains data for most functional areas of personnel, including flexible benefits, succession planning and medical history, a

spokesman said. Update and inquiry is on-line.

All system functions are performed under Mapper.

Individual password protection is provided for basic personnel information, benefits and salary administration, career planning and medical, safety and minority affairs information.

The basic system is available for \$75,000 until June 31 and thereafter for \$150,000 from SMS, which is located at 1N628 Ethel St., Chicago, Ill. 60185.

graphics software can operate.

The packages are now available for Digital Equipment Corp.'s VAX-11/730, Prime Computer, Inc.'s 2250 and Apollo Computer, Inc. computers. The software interfaces to more than 135 graphics output devices, including plotters, printers and slide-making machines, according to a spokesman. It is also available for systems from Burroughs Corp., Con-

trol Data Corp., Honeywell, Inc. IBM and others.

Either package costs \$9,500 with volume discounts available from 10505 Sorrento Valley Road, San Diego, Calif. 92121.

A/P Package Out for Wang

RICHMOND, Calif. — Soft Pro System, Inc. has released an accounts payable package written in Cobol for the Wang Laboratories, Inc. VS system.

The package reportedly prepares the disbursement of checks and maintains a trial balance of unpaid invoices.

A stand-alone package, it can also be integrated with a general-ledger package and was designed for multicompany and multidivision environments, the vendor spokesman said.

Features include on-line interactive vendor record maintenance, batch voucher entry and validation control, accounts payable to general ledger distribution and report and duplicate entry control.

The package is priced at \$1,000 from Soft Pro System, located at 4121 MacDonald Ave., Richmond, Calif. 94805.



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Mortgage Lenders Ask DP to Meet Demands

By Gerry C. Nelson
Special to CW

The intense competition for capital, combined with deregulation and increased demand, makes the '80s a challenging time for companies in the mortgage-lending industry.

With all of the uncertainties, competition and need for current information, more and more mortgage lenders are looking to the computer as a useful tool to aid them in the future.

It is a reasonable statement that any mortgage lender today can afford a computer. The size and capability of the computer is determinable by factors of volume, number of branches and range of services of the installing institution.

Unfortunately, a corresponding and perhaps disproportionate cost of personnel has more than offset the decreased cost of computer equipment. This increase in cost becomes evidenced in the following two areas: operating personnel that could be made more productive through automation and the data processing "expert" that can implement solutions to current manual processes.

Traditional Fears

One of the greatest deterrents to the implementation of computer technology in mortgage lending is the traditional fear of data processing departments by mortgage lending personnel.

Fear that the data processing people will cost too much, do too little and misuse the money invested in nonproductive applications of the computer is common. Most mortgage lenders have had negative personal or second-hand experiences with pie-in-the-sky promises from data processing wizards.

Large corporations have historically hired their own data processing experts and developed the computer applications with their own staff. The major advantage of this in-house approach is the customization or tailored implementation to your environment. Non-data-processing personnel will not have to change to fit the computer system — unless you feel the change is more productive. If the computer implementation is done in a timely fashion, custom-built systems provide greater benefit and are used more than other alternatives.

Unfortunately, in-house developed systems usually are not completed in a timely fashion. Cost overruns in computer implementation are generally the rule, rather than the exception. Quite often these overruns are caused by the tremendous backlog of requests already submitted to an overloaded data processing staff. Another cause could be that the implementers do not understand the needs of the users.

More significantly, in-house systems usually cost three to four times as much as turnkey packaged solutions at the outset. There is also a continuing management and financial responsibility for their on-going maintenance. Keeping the in-house system current often costs as much as

the initial development.

The last five years have seen a tremendous increase in companies that specialize in already programmed mortgage lending solutions. Some firms sell both computer equipment and the application solution, others provide solutions running on their own service bureau computers and others sell just the software.

Regardless of your choice, the benefits to this type of computer implementation are similar. A reasonably rapid implementation of the package (one to six months) is one very important benefit. This is possible.

(Continued on Page 68)

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A black and white photograph of a man with a mustache, wearing a dark suit, white shirt, and dark tie. He is holding a rolled-up document in his left hand and gesturing with his right hand towards a large computer terminal. The background shows a room filled with various computer equipment, including large cabinets and a terminal with a keyboard in the foreground.

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Mortgage Lenders Shake Past Fears About DP

(Continued from Page 65)

ble because the programming has already been completed and is already operational at some other customer location. Having a system already operational takes the guesswork of how it will work out of your decision process. Generally speaking, the cost of purchased solutions will be considerably less expensive than in-house custom-developed solutions.

If your organization does business exactly the way another already installed package user does business (same states, same input documents, same output reports, same procedures, same management style), the package solution is ideal for you. If, however, there are differences, you will find implementation of the

package somewhat traumatic. The most significant problem will be that you will have to change your organization to fit the parameters of the system.

The net result will be that the system will be resented and ultimately rejected by the users of the system — the ones it was supposed to benefit. Another serious problem is that after the system is installed it is very difficult to change to fit the dynamic needs of the user.

Of the small number of vendors that offer "tailorable packages," each provides some preinstallation definition techniques, from a simple solution of options, to table definitions or all the way to a complete "cook-book," fill-in-the-blanks methodology.

This approach has tremendous possibility for the mortgage lender shopping for a computer solution.

A user-definable package can parallel the benefits of an in-house system, while keeping the risks and costs of implementation to a minimum. The greater degree of flexibility in user definition, the more likely the implemented system will fit the organization's needs.

Properly designed computer applications can significantly improve the probability of productive use of the system. A flexible system will also allow the continual modification of the operational system to keep it current with the dynamic needs of the organization (something the turnkey packages often overlook).

Properly designed tailorable systems should offer a range of computer equipment on which to operate so that large or small institutions can afford and benefit from their use.

If an in-house data processing staff exists, the tailorable package should conform to its standards and requirements. The purchased system should be maintainable by the in-house staff if one exists or through user definitions and vendor support if one does not exist.

Nelson is president and chief executive officer of Symbolics Financial Systems, Inc., a Richardson, Texas, firm that provides computer software to the mortgage lending industry.

Tymshare Offers Phone Service

CUPERTINO, Calif. — Tymshare, Inc. has announced a toll-free number for customers who encounter problems with equipment leased or sold by the company.

Through an agreement with Texas Instruments, Inc., Tymshare has set up a centralized maintenance dispatch program in which TI will handle maintenance calls and correct equipment problems experienced by users of Tymshare-supplied terminals, printers, microcomputers, modems and other hardware.

The service will be available by mid-March. The phone number for all states except Texas is (800) 231-3128. In Texas, the number is (800) 572-3300.

Accounting Tool Fits System/34

LITTLE ROCK, Ark. — Arkansas Systems, Inc. has introduced an Automated Trust Accounting System for the IBM System/34.

The system, audited and approved by the Federal Deposit Insurance Corp., produces more than 20 reports for monitoring daily Bank Trust Department operations. Internal reports are said to provide information on upcoming events such as trust reviews, bond maturities, coupon clip dates, dividends due and interests due.

Client reports — provided monthly, quarterly, semiannually or annually — include: transaction report; review of assets; portfolio distribution/stock distribution; and schedule of capital gains and losses.

The software costs \$10,000, a spokesman said from Suite 202, 8901 Kanis Road, Little Rock, Ark. 72205.

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For Monitoring Profitability Bank Bucks Up Information Base With Package

CHICAGO — Like an athlete in training, the Sears Bank & Trust Co., a subsidiary of Midland Bank Corp., ran through its plays and then analyzed its strengths and weaknesses. By relocating recently from Chicago's West Side to the city's financial district, the \$480 million bank was competing against some of the country's largest financial institutions.

"Management felt that some of the software in place was not at a level to compete with the group of banking institutions in the Chicago Loop," said Dennis Reidy, vice-president of data processing at the Sears Bank & Trust. "An overall upgrading of software was initiated as well as the automation of several manual systems, one being the analysis of customer profitability."

Sears Bank & Trust had efficiency problems when monitoring corporate customer profitability. Commercial loan officers believed their accounts were profitable, but their assumptions were not always based on current information.

Software Evaluation

The bank was led to the Customer Information File (CIF) and Customer Profitability Analysis System (Cpas) from University Computing Co. (UCC) of Dallas. Software evaluation committee representatives found that out of four major financial software vendors studied, UCC was the only firm in '78 to tie profitability to a customer information file system.

"That criterion was important," Reidy said. "By installing both UCC systems, we wouldn't have to rethink the process for profitability when initiating and establishing new customer relationships on file. One area of the bank would be able to control simultaneously the opening of a file and the creation of profitability relationships through one centralized system."

Cpas was installed on an IBM 4341 running DOS/VSE. "DP found the Cpas system easy to install and maintain," Reidy said. "It is written in Cobol and is very modular, which facilitates subsequent modification."

With Cpas, the bank can maintain a timely profitability profile on hundreds more customers than was possible before, Reidy said. Previously, only 70 accounts were monitored manually; Cpas enabled that number to grow to 900. Reidy added, "With the manual system, an analysis of customer services was produced about every three months, annually or when a customer had a loan application appearing before the review committee. Now the customer profit-

ability analysis is produced monthly, yielding current, on-line information in summary or in detail for the most recent month.

"Cpas does not make the decision of whether or not to lend," Reidy said. "It enables loan officers to react to applications quickly since the research to check a client's profitability and past lending history is eliminated."

"The system reports the cold facts such as the customer's average balance over the past year, if the customer's business is cyclical and whether he has honored previous deposit commitments or compensating balance agreements. This on-line

data retrieval is possible because Cpas allows a considerable amount of customer history to be stored. The Sears Bank stores 25 months of history for each of its 900 Cpas-monitored clients," he added.

Before the installation, three clerks in the operations department had required at least 20 days after the close of each month to prepare 70 demand deposit analysis statements. With Cpas, their data gathering role ended. Previously, the clerks had fallen a month behind in the preparation; they now take on a verification role as Cpas completes the 900 current statements within five days from the month-end closing.

Cpas also is used to verify what deposit or compensating balance agreements, which are written at the beginning of the bank/customer relationship, are being honored. "No other system we saw provides the bank with a profitability picture of its customers that includes all their relationships and agreements," Reidy said. "For example, a customer may agree to keep a balance of \$50,000 to offset the cost of maintaining the relationship. If he goes high on activity and low on the balance, the yield is down for the bank and we lose profit. Now, Cpas reports these fluctuations in time so management can react to the situation."

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Financial Modules Out for HP 3000

ARLINGTON HEIGHTS, Ill. — Bakco Data, Inc. has developed 12 modules of Warehouse Distribution and Financial Control Applications for Hewlett-Packard Co. HP 3000 computers.

The firm utilized HP's Image Data Base Management System, along with Quasar Systems Ltd.'s Fourth Generation Application Generator language in translating its Digital Equipment Corp. On-Line/Interac-

tive/Multi-Processing Applications for HP.

Bakco's method reportedly allowed the work to be done in 20% of the projected time. The 12 modules cost \$4,000 to \$8,000 each from Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

'Quicklib' Aids HP 3000 Users

SAN LUIS OBISPO, Calif. — Computer and Software Enterprises, Inc. has announced software said to facilitate Hewlett-Packard Co. HP 3000 users in building, maintaining and reporting Ksam Cobol copy libraries.

Quicklib is said to be accessible directly from the prompt of either HP's editor, Edit/3000 or Robelle Consulting, Inc.'s Qedit.

This method of access reportedly allows programmers to switch between editing programs and editing or listing copy library elements.

Quicklib is available for a one-time price of \$1,500 or on a rental basis for \$300 per six-month period, according to a spokesman. The vendor's address is P.O. Box 1766, San Luis Obispo, Calif. 93406.

Text Editor Runs on Prime

SOUTH PASADENA, Calif. — Shirley Software Systems, Inc. has released a full-screen text editor for use on Prime Computer, Inc. machines.

Directed is cursor-controlled with on-line, interactive word processing capabilities. It is said to operate on a variety of terminals and to generate user-defined commands.

The editor carries a one-year warranty with maintenance available after that for 10% of the original purchase price. Directed costs \$4,000 for a permanent license and is available on a lease basis from Suite 208, 1936 Huntington Drive, South Pasadena, Calif. 91030.

'Network Manager' Targets System/38

SALT LAKE CITY, Utah — GCI Information Systems, Inc. has introduced an integrated accounting, billing, traffic and reporting package for common carrier resellers using the IBM System/38.

Called Network Manager, the package consists of program modules.

The package is available for a \$75,000 one-time license fee. A service bureau arrangement is also available through P.O. Box 6439, 1137 E. 2100 South, Salt Lake City, Utah 84106.

Horizon Systems Announces Testing Service

RESTON, Va. — Horizon Systems Corp. has announced a quality assurance measuring and testing service for software that is purchased or developed in-house.

Tests and reviews are formally designed for three milestone points: following requirements analysis, after the design documents are complete and after implementation but prior to acceptance by the sponsor.

Acceptance testing consists of three components: hands-on functional testing, performance testing and documentation review.

Prices start at \$2,500 and range from 8% to 10% for large applications, according to a spokesman for the firm.

Horizon Systems can be contacted at Atrium 6, 11250 Roger Bacon Drive, Reston, Va. 22090.

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Micro Notes

The Software Link, Inc. has announced **MultiLink**, a product that is said to convert IBM's PC-DOS on the IBM Personal Computer into a multiuser, multitasking operating system. The package allows the Personal Computer to support up to eight terminals. It costs \$200 from 6700 23-B Roswell Road, Atlanta, Ga. 30328.

EMS, Inc. has announced the **CP/M Connection**, the **DOS Connection** and the **CP/M-86 Connection**, products that are said to allow applications developed under the UCSD P-system to run on Digital Research, Inc.'s CP/M and CP/M-86 and Microsoft, Inc.'s MS-DOS operating systems. In most cases, no modification or recompilation of the source code is required, the company claimed. Each package costs \$100 from 5496 Haussner Drive, Concord, Calif. 94521.

Daystar Systems, Inc. has announced **UltraTrap**, a parity error-handling utility program; **Ultrafast**, a flexible disk random-access memory emulator; and **UltraBoot**, a dynamic memory allocation utility for the IBM Personal Computer. The three-program utility package costs \$40 from Suite L, 10511 Church Road, Dallas, Texas 75238.

Data Node, Inc. has added two utility files and an application package to its DN 82 hardware converter that is said to con-

vert any standard RS-232 terminal into a Zilog, Inc., Z80A-based microcomputer running Digital Research, Inc.'s CP/M operating system. **Config** gives the user the ability to configure hardware through the software. **Remem** can restore from memory any program that has just been run. **Calcost** is a cost projection application that allows instant computation of materials and cost for any product or project. The programs are bundled at no extra charge into the DN 82 package, which costs \$1,995 from Suite 103, 1440 Koll Circle, San Jose, Calif. 95112.



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IN DEPTH



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By Gerald M. Weinberg

The workshop was "Becoming a Technical Leader." The subject was power.

"Power comes from position," Austin said for the 10th time. "Until my promotion, I couldn't make things happen in my organization."

"Not so," Kevin said. "Before I was promoted, I could really accomplish things because of my technical skill. Now I can't even use that."

"I disagree with both of you," Isabelle said. "Technical skill may help when you are a low-level employee, but unless you have personal power, promotion to the supervisory ranks won't do anything."

This had been going on for three hours, getting nowhere. I interrupted. "My own personal power is sinking fast. Since I'm in charge here, I'm going to use some of my positional power to call a time-out. Besides, if we don't hurry we'll be late for the movie."

The movie was *E.T.* — the tale of an extraterrestrial's encounter with earthlings. I couldn't get my mind off the subject of power, which must have influenced the way I saw *E.T.*'s predicament. When his spaceship makes a hasty departure from earth, *E.T.* is accidentally left behind, the perfect symbol of powerlessness.

E.T. is naked. He has no tools. He is lost in an alien environment, light-years from home. All this is bad enough, but people will not leave him alone. The entire U.S. government is determined to capture *E.T.* so he can be dissected like a laboratory frog. And so the plot is set — a power struggle between "the greatest

IN DEPTH

nation on Earth" and one lost, naked midget.

But E.T. is not a suspense movie. From the beginning, I was willing to bet that the government never had a chance. I knew that — and every kid in the audience knew that. What made the movie so much fun was that nobody in the government knew.

We discussed the suspense angle at dinner. Austin was perplexed. "How did you know E.T. would win?"

I thought the government had all the power."

"Not against E.T.'s personal power," Isabelle replied.

Kevin corrected her. "Not personal power. E.T. had a superior technology."

"Personal power? Technology? I'd call it magic. It was unrealistic."

"Not unrealistic," I said, "merely unrecognizable."

"What do you mean?"

"It's called Clarke's Third Law:

Any sufficiently advanced technology is indistinguishable from magic."

Kevin clarified this. "It's just like managers and programmers. To my manager, my technical work is pure magic."

"Well, it works the other way, too," Austin said. "We managers have lots of organizational power, which you programmers don't understand. We can mobilize resources to get things done. Don't underesti-

mate the power of managers."

"You sound like those bureaucrats in the movie."

"No name-calling," I said. "Austin and his managers are frustrated because the programmers don't play by the rules of their power game. The programmers are not in a power struggle: They just want to write programs. E.T. is not in a power struggle: He just wants to go home. Once E.T. decides he has to go home, the government is powerless."

"But where does programmer power come from?" Austin asked.

"Wasn't it Victor Hugo who said that nothing in this world is as powerful as an idea whose time has come? In our time, the idea is technology, especially information processing technology. The programmer partakes of this technology power, in the same way that E.T. tapped into some mysterious life-force. The only difference is that E.T. knew what he was doing, while programmers usually do it unconsciously. The typical programmer takes technology power for granted — until it disappears."

"Like when he becomes a manager," Kevin said, "and his brain goes soft."

"Kevin, I think your view of power is too simplistic for you to understand why programmers often lose power when they decide to accept supervisory positions — positions of power. Let me lecture you on the nature of power as a relationship."

"Does it have to be a lecture?" Isabelle asked.

"All right, let me tell you a story."

Power as a Relationship

"Once upon a time, I walked out of a tedious planning meeting because I felt incapable of accomplishing anything. After the meeting, the chairman confronted me in my office and accused me of irresponsible use of power. He would never have the nerve to stand up and leave a meeting, no matter what was happening. To him, my leaving meant I possessed unimaginable power, while to me it meant I was powerless. To me, his being appointed chairman meant he was obviously the one who had all the power."

"We were both wrong, because we both thought power was something we possess. Power is not a possession, but a relationship. I saw the chairman as powerful because of my relationship to the organization that appointed him. I depended on the organization. It can take away my livelihood — it must be powerful. The less dependent I am, the less powerful the organization seems."

"The chairman thought I was powerful because he projected his own situation on me, as if I were a movie screen. When I acted in a way that would have required power from him, he concluded that I was a powerful person. If a woman had left the meeting in the same situation, he might have seen her as weak. Instead of identifying with her personally,

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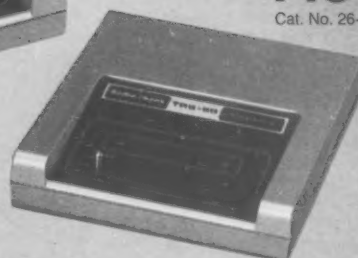
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IN DEPTH

he might have used her as a screen for one of his female stereotypes."

Programmer Power

"Then your theory," Isabelle asked, "is that nobody possesses power? Is it like love — something you only have with other people?"

"Very much like love."

Kevin disagreed with us. "That sounds too abstract for me. You just do not want to admit that an expert programmer like me possesses something that you do not have."

"You do possess something, but it's expertise, not power. Any power you get from that expertise is based on a relationship between you and someone else. If you were the leader of a mountain climbing team, your programming expertise would contribute no power at all."

"But I'm not the leader of a mountain climbing team. I'm the leader of a programming team, so my expertise is power."

"It may be, in your particular team, but it doesn't have to be on all teams. It depends on the relationship of the leader to the other members of the team."

"Give me an example."

"If your team consists of novice programmers," Austin said, "your expertise will give you considerable power. But if the other team members are also experts, they will attach less importance to your technical expertise. In that case, they will pay more attention to organizational power — like the power to acquire an extra terminal, to extend the schedule or to capture a more interesting assignment."

"I may owe you an apology, Austin. I'm beginning to see how we can both be right at the same time. It's perplexing, though."

"The idea of power always seems to have this puzzling aspect," I said, "because people aren't used to thinking in terms of relationships."

"Like when I was promoted from team member to team leader? I definitely experienced a loss of power, which is why I strongly disagreed with Austin's argument."

"Exactly. Your expertise didn't change, but it wasn't very important because other people's expectations changed."

Kevin laughed. "I struggled to show the team that my technical skill hadn't diminished, but all I did was convince them I was a weak leader."

"Of course," Isabelle said. "If you really have power, you don't have to struggle to show it. That's what personal power is all about."

"If that's what happens when we try to acquire power," Austin asked, "how are we supposed to go about it?"

"I don't care about acquiring power, but I don't want to lose the power I have," Kevin said.

"How can I get more responsibility without losing my power to get things done?"

"The answer should be obvious," I replied, "but I don't think you two are going to like it. Isabelle is on the right track. The first step in keeping power is to stop trying to hang onto it."

"You always talk in paradoxes."

"It's not a paradox. The desire for power is not a desire for a thing, but for a relationship..."

"...and you don't keep or build relationships the same way you keep or build things," Isabelle added.

"I still don't understand," Kevin said.

"Consider this. You want something, but you haven't figured out what it is. You think you're dissatisfied because you don't have the power to get what you want, but the problem is that you can't visualize what you really want."

"So as long as I'm blinded by this illusion, I'm in danger of losing power whenever something changes?"

"If you don't know what you

want, power is useless to you."

"So if I concentrate on what I want, power will come to me?"

"Not necessarily. Concentration is necessary, but even when you concentrate, you may not be able to prevent the loss of power."

"Then what else do I have to do?"

"If you keep asking that, you are too blind to understand the answer. Don't seek a promotion to get power. Step away from the lure of power and learn more about yourself."

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IN DEPTH

"That's what I meant by personal power," Isabelle said.

"It makes sense to me now," Kevin said. "I really had no idea why I accepted a promotion, but I was flattered by the idea of being made powerful."

"So when you see a chance for power, ask yourself what you want power for. If you don't know, you are sure to falter and lose your way when your old power starts to crumble — and it must before your new

'When you see a chance for power, ask yourself what you want power for. If you don't know, you are sure to falter and lose your way when your old power starts to crumble — and it must before your new power starts to grow.'

power starts to grow."

"That reminds me of E.T.," Isabelle said. "He didn't want power.

But because he knew what he really wanted, he beat the 'powerful' at their own game."

"I still don't understand," Austin said.

"E.T. really wanted to go home," I said. What do you really want?"

Good Things Leaders Do

Being a leader is tough, but becoming a leader is even tougher. Our workshop was designed to help people through this difficult transition.

The fundamental method is simulation. Anything is tricky the first time it is done. Simulation allows us to experience the thoughts, emotions and mistakes of a new situation without worrying too much about what it will cost if we bungle — or what other people will think.

Absence of Leadership

The first simulation is called "Getting Yourselves Organized" (GYO). After a brief introduction, the workshop participants receive a written description of their assignment — to organize themselves into teams and to arrange the furniture to create a learning environment for the coming week. It usually takes 20 people about three hours to do this. Some groups finish in as little as an hour. One group took four days.

The GYO simulation was designed to teach people about leadership. It is all around us, but when you ask someone to define leadership, he always seems to have trouble. The GYO simulation is like taking a fish out of water — the fish suddenly notices what was there all along. Then it struggles and gasps, trying desperately to get the water back.

When the simulation is finished, many participants are discouraged that it took so long to perform such a simple task. They seem to want to forget the experience as quickly as possible, but my job is to be sure that, regardless of their feelings, they learn from the simulation. Rather than dwell on failure — which is inevitable — I insist that each person come up with at least one personal act of leadership that took place during the simulation.

At first, the participants have difficulty thinking of anything. Not used to thinking about the components of leadership, they are discouraged. But with a little prompting, they soon get ideas. In 50 classes, nobody has ever failed to come up with an act of personal leadership.

During a recent class in Japan, I recorded all the responses in order to make cross-cultural comparisons. Even though it was a different culture and even though (unfortunately) there were no women in the class, the responses were typical of other classes.

List of Leadership Actions

The responses are listed in the order in which they came up:

1. "I took the risk of opening discussion on a new topic."

(Continued on In Depth/7)

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IN DEPTH

Do Technical Leaders Get Rich?

As T.S. Eliot said, "April is the cruellest month" — especially if you have not kept good income tax records. I was so busy making money last year that I did not keep track of where it was going. So last April, I attended an evening tax seminar offered by a local broker.

The seminar was packed. During the intermission, I saw my old friend, Oran.

"The last time I saw you, you were in the workshop on 'Becoming a Technical Leader.'"

"After that, I went to corporate headquarters to accept a promotion to my first management job."

"Oran, you are a mental marvel. I could use you to keep my tax records. Things have gotten a little out of hand — which is why I'm here tonight."

"It's not a bad seminar, actually. I particularly like the information lists they've distributed on tax shelters."

"But why are you here, Oran? I can't imagine that you, of all people, have not kept good tax records."

Oran grinned. "No, of course that's not the reason. The problem is that I have managed to accumulate a little excess cash, which I would like to invest with a minimum of taxes."

"I guess your promotion was profitable," I said.

"You must be kidding?"

"But I thought you got a big raise."

"My raise was \$303.56 a month."

"No wonder you're looking for tax shelters."

"I'm afraid you're making the same mistake I made, much to my regret."

"What mistake?"

"You are looking at the gross, not the net. Here, let me show you."

Before I could move away, Oran pulled out a pen and a piece of paper.

"First, of course, there are taxes. If I remember correctly, my deductions went up by \$136.56."

"Just round it off, Oran."

He wrote down \$137. "That was just the most direct and obvious expense. In order to live up to my new

image, I had to get rid of my '65 Beetle. Do you realize how much new cars cost today?"

"Be reasonable, Oran. That Beetle wasn't going to last forever."

"Yes, but it had a few more good years — and it was fully paid for and depreciated. The new car had a monthly payment of \$216."

He wrote \$216, but I objected. "You really cannot attribute all of that expense to your new status as manager. You have a new car, which is worth more than the old one..."

"...and also costs a lot more to run. But you're right." He crossed off \$216 and wrote \$100. "And that's a conservative estimate, just of the prestige cost. I'll have to add another \$40 a month for gas, plus \$25 dollars for parking."

"But you had to park the Beetle, too," I pointed out.

"I got a special rate for small cars. The regular rate is \$25 higher."

"What about gas? Isn't mileage better on new cars?"

"Better than the old big cars, but not better than my Beetle. Besides, I used to bike to work a couple of times a week. After the promotion, I couldn't do that."

"Why not?"

"First of all, it isn't seemly for management. Second, managers wear suits, not sweat suits. And third, managers work late several nights a week and who wants to bike home in the dark when you're late already?"

"It is hard to imagine you wearing a suit to work."

"I had to buy three right away. My clothing bill went up about \$50 a month." He added \$50. "And working late really adds to expenses."

"How?"

"First, there's the eating out, which amounted to about \$60 a month. Then there was extra baby-sitting when my wife was out for the evening, too. We figured an extra \$50 a month, conservatively."

"Eating out a few nights a week isn't all that terrible," I said.

"It is if you have to run in, eat and run back to work. It kills the digestion and puts on weight."

"Well, I suppose not bicycling to work adds to the weight problem, too."

"Or it could have been the extra drinking. My booze bill climbed about \$40 a month, though I don't think Scotch really cures tension headaches. It only puts them off until the next morning."

"You don't look as if you've gained an ounce," I said.

"I joined a health club — \$40 a month plus towels — to control the weight. I don't have to put anything down for towels, though, because I never had much time to go there and work out."

"So what's the net of all this?"

"You can see for yourself," Oran said as he finished computing the total. He showed it to me:

Additional income	\$303.56 a month
Taxes	137
Car payment	100
Additional gas	40
Larger parking space	25
Eating out	60
Baby-sitting	50
Extra booze bills	40
Health club	40
Additional expenses	\$492 a month
Net loss	\$188.44 a month

"Looks bad," I said, "but that was two years ago. By now you must have moved to a higher salary level. You said you had some extra funds to invest."

"Not from managerial salary. I kept all these figures in my head," Oran said.

"I can imagine."

"It was worrying me. I didn't know what to do about it. Imagination is not my strongest asset, you know."

"Well, I'm sure you underestimate yourself, Oran."

"No, I don't think I'd have figured out what to do if my 11-year-old daughter Elda hadn't caught chicken pox. She has a morning paper route, which I had to take over when she got sick."

"I can just see you getting up at 4:30 a.m. to ride around the neighborhood delivering the paper. How long did you have to do it?"

"That's the point. While I was riding around delivering papers, I had a lot of time to think. It was good exercise, which I didn't have to pay for. In fact, it paid me. By the time Elda was better, I had lost 8½ pounds and the headaches had gone away," Oran said.

"You didn't take your daughter's paper route, did you?"

"Of course not. What do you think I am? I got my own paper route. Besides, I can handle a bigger route than she can, so it pays more."

"I don't believe this, Oran. If you're so concerned about a manager projecting the right image, how can you risk being seen delivering papers?"

"It's not a risk. First of all, none of the right people are up that early. But I'm no longer a manager. I asked for my old senior programmer job back and got it."

"Did you have to give back the raise?"

"Yes and no. I kept the manager's salary, but lost one year's annual raise, which puts me a little ahead of where I would have been if I'd never taken the job in the first place."

"And that's where the extra funds come from?"

"Oh, no. Those are the savings from my paper route."

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(Continued from In Depth 5)

This response came from the first person who spoke during the simulation, when everyone was too discouraged to begin. He raised the question of what the group was really supposed to do. In Japan particularly, it is difficult to speak first in the presence of authority figures. In the U.S., there is usually someone in the group who is more than willing to serve this function, but many individuals never have the courage to do it.

2. "I gave the group a theory to use to watch its own development, a model that will change the way they see things."

This person made an early prediction of how the simulation would operate. He was only partially correct, but by making the prediction, he raised the possibility that the group could observe and predict its own actions — an essential leadership function.

3. "I compromised appropriately and did not compromise inappropriately."

It is easy to overlook the act of abstaining from action. This participant was conscious of having a personal point of view that he did not press. He felt that speaking up would only prolong the exercise, without contributing anything essentially better, so he kept his opinion to himself. Many would-be leaders are unable to withhold any idea that pops into their mind — their enthusiasm for their own ideas blinds them to the purposes of the group.

But other would-be leaders are unable to stand by their ideas in the face of conflict, even when those ideas may be positive contributions. Therefore, "not compromising inappropriately" is just as important as knowing when to yield for the good of the group.

4. "I observed everyone to see what needed to be done that was not being done, then did it or saw that it got done."

This may seem an obvious act of leadership, but much of the time, most of the participants were so busy moving furniture and arguing that they never took a good look at themselves. And those who did step back were often ineffective at sharing their perspective with the others.

5. "I restructured the task for more effective work."

This participant took the risk of seeking a redefinition of the problem. When the group was locked in a seemingly endless discussion over the location of a pair of tables, he observed that the as-

signment did not specify that the furniture could never be moved. The arrangement could be changed if circumstances changed. This suggestion concluded the argument and also abbreviated

subsequent arguments.

6. "I restructured the group for more efficient work."

Once the teams had been chosen, this participant suggested that there was no

need for the entire group to work on the complete arrangement of the room. Instead, an overall pattern was worked out, then each team designed its own work space to its own satisfac-

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IN DEPTH

tion, without interfering with the other teams.

7. "I made an inventory of resources."

When everyone was debating about how much furniture each team should get, this participant counted the furniture and reported his tally to the class.

8. "I asked questions."

This participant asked whether it was possible to obtain more tables and chairs or to remove some from

the room. The answer was yes, which greatly simplified the problem of an uneven number of chairs.

9. "I listened when everyone else was talking. I even listened when one person was talking."

How simple. If everyone listens when one person is talking, a situation in which everyone is talking at once will never arise. And if this troublesome situation does arise, what could possibly help more than keeping one's mouth shut?

10. "I watched for misunderstandings."

More than simply listening, this participant actively facilitated the group's communication process. If he detected a sign that a misunderstanding had occurred, he intervened by slowing down the process. He did not seek agreement on how to solve the problem, but only on what the problem was.

11. "I put myself in their position."

Empathy is another form of active listening. At one point in the debate over the room arrangement, this participant moved over to the part of the room occupied by another team, so he could see the problems they were having with his proposed solution. This was an embodiment of the empathy he displayed throughout the debate.

12. "I was ready and willing to do hard physical labor when necessary."

Although the assigned task required much talk and planning, it was necessary for someone to roll up his sleeves and move furniture. If leaders show unwillingness to do some part of the task, that part is labeled as low-status dirty work, which inevitably creates leadership problems later.

13. "I worked hard, but not so hard that I locked out feedback on the results of my work."

Nobody is clever enough to work perfectly all the time without corrective or confirming feedback. Feedback comes in many forms — sometimes shouted, but usually more subtle. Although it is essential for a leader to be absorbed in the task, it is also essential not to be so absorbed that the rest of the world is permanently shut out.

14. "I encouraged others in productive, but different behavior. I also encouraged others to continue the same behavior if it was productive."

Innovation carries risk, which is difficult to bear alone. Two or three words of encouragement from one person in a group can have a startling effect on one's willingness to risk a new behavior. But if only new behavior is encouraged, people soon get the impression that the only worthwhile contribution is to be constantly changing something.

15. "I withheld negative comments for a more appropriate time."

Though three positive words can encourage productive behavior, a single negative word can be devastating. In fact, it does not even require words — at just the right moment, a raised eyebrow or a snicker will suffice. If you want to discourage innovation, throw in negative reactions the instant they arise, but if you want to be a technical leader, learn to remain silent until a more appropriate time. And sometimes that time will never come, which is just fine.

16. "I offered ideas."

The key word here is "offered." Everyone realizes that leaders present ideas to a group, but the manner of presentation is often ignored. Some leaders impose their ideas on a group. Others bestow their ideas on the group, as if those ideas are somehow better than the ideas of ordinary mortals. Still others insinuate their ideas indirectly, as if the group is not mature enough to handle ideas presented directly.

This participant offered his ideas to the group. They were something

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he had to give, but only the group could decide on their worth. He was not committed to his ideas if they were not useful to the group.

17. "I admitted a mistake."

Some people believe leaders must be superhuman and never make mistakes. The problem is that human beings cannot identify with superhumans and certainly will not allow themselves to be led by them. Admitting mistakes gives others permission to make mistakes, which is actu-

ally permission to take risks. If you never do anything wrong, you never do anything.

18. "I had the courage to appoint myself leader, even though I might have been shot down."

Of all the ideas you can present to a group, the most risky is the idea that you might be the one to lead it. If the group rejects this idea, it is easy to believe that they are rejecting you as a person.

You must either be foolish or cou-

rageous to risk direct personal rejection by your peers, so most people approach leadership indirectly. At just the right moment, this participant went to the front of the room and started writing the group's ideas on the blackboard. Nobody shot him.

19. "I followed sensible leadership when it was offered by others, rather than insisting on being the leader."

When someone else shows the courage you wish you had displayed,

it is tempting to attack him in order to conceal your own timidity. The second most difficult act for many would-be leaders is the act of not attempting to lead when someone else is doing a good job.

20. "I gave others a chance to succeed or fail for themselves."

The most difficult act for would-be leaders is not attempting to lead when others are *not* doing a good job.

21. "I set an example for others to follow."

This statement is a summary of everything a good leaders does.

This list was generated directly from ordinary people's experiences in a leaderless situation, but few professors can produce a more useful set of guidelines for would-be leaders.

The list is eloquent evidence that everyone has leadership potential. In each individual, some elements are better developed than others, but anyone can improve as a leader simply by building the strength of existing elements.

Of course, generating a list in this fashion is not likely to produce a complete inventory of leadership actions. After the GYO discussion is finished, I post the list with an open number at the end. I then invite the participants to add items to the list whenever they arise.

What Is the Value Of Technical Leadership?

When I first went into business for myself, I was afraid to quote prices. Until I could put a value on my services, any price sounded high — not just to me, but to my clients. The workshop, "Becoming a Technical Leader," sounded particularly expensive, because its price included a full week in residence with two instructors.

To make matters worse, it was a leadership workshop. Many of my clients had already taken leadership workshops — often at a much lower price. They wanted to know why technical leaders were different from ordinary leaders, why a special workshop for technical leaders would be worth the extra price.

I used to get offended by requests to provide economic justification for my work in monetary terms. I was cured when one client pointed out that since I defined leadership in terms of increases in group productivity, I ought to be able to define and measure technical leadership in the same way. I had to prepare some dollars-and-cents cases to demonstrate just what technical leadership means. Several examples follow:

Case 1. The Collapse. At first, I thought Joe might learn nothing from the workshop. He was extremely quiet and, in keeping with the tone of the financial institution that sent him, seemed straitlaced. I was particularly concerned about how he might react to some parts of the simulations.

One exercise teaches principles of

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design through building structures out of unusual materials. At the beginning of their construction project, Joe's team made a poor design decision. An hour later their entire structure collapsed — with Joe underneath it.

I did not see Joe until several years after the workshop, when he attended a different workshop I was holding near his home. He wanted to talk to me about the effect "Becoming a Technical Leader" had on him.

Shortly after the workshop, he was put in charge of a major development project — estimated to represent a \$3 million investment in software alone. About six months into the project, Joe had a dream in which he was back at the technical leadership workshop, under the collapsing structure. He did not think about it, but the same dream recurred on several successive nights. One morning on his way to the weekly project meeting, Joe was thinking about the dream and suddenly realized that their \$3 million project had been designed exactly like his team's ill-fated structure.

"Our early decisions were unsound," he explained, "though they seemed good at the time. But we'd not reexamined them in the light of recent changes. That was what made our structure ultimately collapse, and it would certainly have done the same thing to our project. Then it was a game, but now it was dead serious. And just like the last time, I would be under the structure when it fell."

At the project meeting, Joe called a halt to further work until the original design decisions had been reevaluated. As a result, the project took a new and ultimately successful turn. In Joe's estimate, the project could never have been successfully completed without the redesign.

Based on previous experience, Joe estimated that without the redesign, they probably would have doubled their original budget estimate before realizing that the project had to be axed. Considering the original estimate as the value of his improved technical leadership, Joe figured his company got a \$3 million return on an investment of less than \$2,000.

Whatever the source of the savings, this case clearly illustrates that

'Technical activities are those in which knowledge can have a catalytic effect. A tiny increase in the leadership ability of technical workers can have an enormous payoff.'

technical activities are those in which knowledge can have a catalytic effect. Therefore, a tiny increase in the leadership ability of technical

workers can have an enormous payoff on the bottom line.

Case 2. The Kludge. The second case involves three people who par-

ticipated in "Becoming a Technical Leader" at different times. Their manager, who never attended the workshop himself, called me to report the results.

The firm sold hardware/software systems, but its latest offering was deadlocked by a technical problem. One part of the system required a special piece of hardware — a unit that would add about \$50,000 to the cost of each system. Market surveys showed that the added cost would

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eliminate a profitable portion of their market. The design team was dismayed, but could not think of a viable alternative.

Two of the seven designers had already attended the workshop, but Jan returned from it in the middle of the dilemma over this problem, which they had labeled "the kludge." Seeing that the rest of the team was acting ineffectively, Jan suggested they try some new techniques.

First, they informed their manager that they must get away from the office, where frequent distractions were depleting their problem-solving resources. The manager was shocked by this request, but agreed to authorize three days in a nearby motel. To his surprise, they returned after a day and a half.

The manager explained, "I don't have any idea what they did at that motel. I'm not even sure I want to know. But when they got back, they

had a detailed solution in a direction we had entirely overlooked. It not only relieved the problem, it entirely eliminated the \$50,000 kludge."

Over 100 of these systems have been sold. One can only speculate whether that many would have sold at a far higher price, but the manager gave his group credit for saving "\$5 million at the very least." For approximately a \$6,000 investment, the result is effective, even without counting additional benefits.

Even if the cost of the motel room is counted, this is another example of the catalytic power of leadership in a technical environment. It also illustrates that technical leadership need not reside in just one member of a group and that good leadership spreads through modeling behavior. Only three of the seven members of the team had been through the workshop, but that was enough to convince the others to adopt some new problem-solving techniques.

Case 3. The Leak. One workshop exercise involved methods of "thinking the unthinkable." In the middle of the exercise, Gail emitted a protracted outburst. Thinking she might be injured, we stopped the exercise for an explanation. As it turned out, Gail had been thinking the unthinkable about the billing system she used at work, and the injury was merely psychological.

Gail explained that the billing involved tens of thousands of small bills, adding up to over \$1 billion a year. The system was almost completely automated, though frequent changes were required to the billing algorithm. While thinking the unthinkable, Gail imagined a circumstance in which the billing algorithm did not work correctly. In fact, it did not work at all and certain services were not billed.

Gail returned to work and examined the system. The "unthinkable" case turned out to be rare — occurring about once in a thousand bills. But, as Gail said, "one-thousandth of a billion dollars is a million dollars."

The problem had been in the system for over two years, but there was no way to recover the lost revenue. Nobody can say how long the flaw would have stayed in the system, but two more years seems to be a reasonable estimate. In that case, Gail saved the company \$2 million — actually much more, though she could not reveal the company's confidential billing figures.

This case illustrates technical leadership in its purest form — the leadership of ideas. Once Gail had discovered the problem, she had no difficulty convincing anyone that it needed to be corrected immediately. The group interaction was simple, but it was worth \$2 million. If Gail had not taken the initiative by thinking creatively, the error might have remained undetected forever.

A final point to consider is that leadership is not consumed when it is exercised — if anything, successful leadership breeds more successful leadership. So, the true leverage on an investment in technical leadership might be much higher.

About the Author

Gerald M. Weinberg is a consultant and trainer at Weinberg and Weinberg in Lincoln, Neb. He is author of *The Psychology of Computer Programming* (Van Nostrand Reinhold, 1971) and 16 other books.

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Software Copyrights: Mapping New Territory

By Norman L. Wilson Jr.

When the farmers and sheep raisers moved West, invading the cattle ranges, range wars were inevitable. For years, ranchers had driven their cattle to grass and water with no attention to property lines and boundaries. By being there first, the cattle ranchers had established their rights — or so they felt. As grass and water became more scarce and more valuable, all over the West range wars were fought over fenced land. Boundaries and property lines assumed a new and momentous significance.

The range wars were very much a consequence of undefined boundaries. Today we have another set of undefined boundaries, and the stakes are just as high. The issue is not the extent of land to be fenced in, but the extent of copyright protection to be afforded a computer program owner. Just as the influx of settlers

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increased the value of grasslands and water, today the rapidly growing number of computers is enhancing the value of software.

The framers of the copyright laws did not envision the problems raised by advanced electronics. High technology has spawned copyright questions that cannot be decided by direct application of the laws. As a result, strong competing claims are being asserted, this time to source code rather than to sources of water.

When boundaries are not definable by the literal terms of the Copyright Act, they must be fixed by applying more general principles of copyright law. Through the years, a certain moral right to the integrity and reputation of artists has become imbedded in copyright law. This right is not mentioned in the Copyright Act, but such moral aspects of the law come from British common law. Accordingly, when existing law is unable to give the courts clear guid-

ance, these aspects of the law are significant. Suits become more equitable.

Decisions are drawn by balancing accepted principles of law against the creator's right to a monetary return. In establishing boundaries in competing copyright claims involving computer programs, courts in some cases are faced with the task of determining new factors for use in interpreting copyright law. This, of course, shifts the boundaries of es-

tablished copyright law. A look at some of these modern frontier disputes will show how the boundaries have shifted.

The Copying Boundary

A song entitled "No Man Is an Island" was written in 1950. The title is the first line of the lyrics, and the second line is, "No man stands alone." In 1953, a music teacher and a school teacher composed a song with different music and lyrics, but the two opening lines and the titles were identical. Consequently, the parties competed in court, even though only two lines were claimed to have been appropriated. In the course of the trial, the court reaffirmed a well-known tenet of copyright law: A "plaintiff must establish that actual copying occurred in order to make out a case of copyright infringement."

The court acknowledged that it is virtually impossible to prove direct copying. Evidence must be circumstantial. Accordingly, the plaintiffs argued that the two teachers must have heard the plaintiff's song on a radio or television broadcast before writing their own. Fred Waring used the song as part of his repertoire. Nevertheless, the court dismissed the complaint, proclaiming that the plaintiffs failed to prove copying.

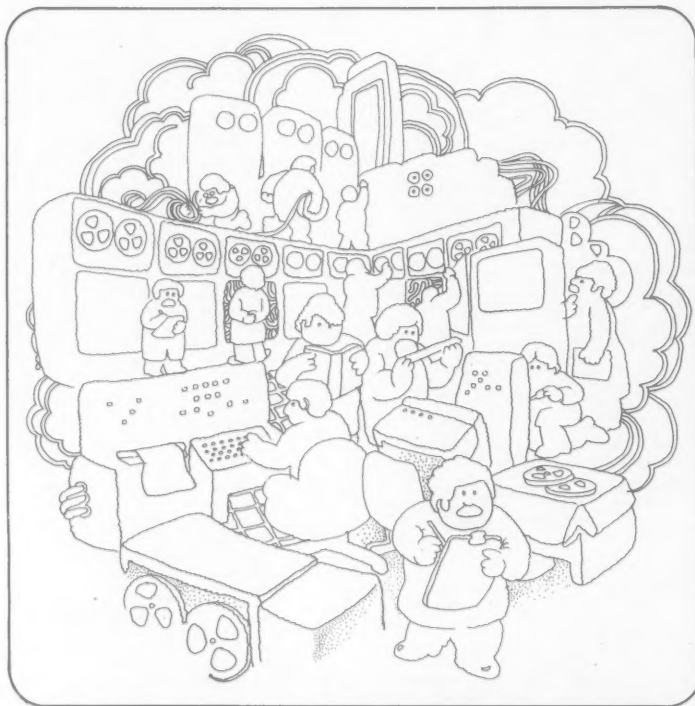
Since it is practically impossible to provide a witness to prove copying, the courts have long held that it is sufficient to establish access by the alleged infringer. The "No Man Is an Island" suit showed that access may not be inferred. In fact, a manuscript physically in the same city was deemed insufficient evidence of access. Possession must be shown. It is apparent, then, that the courts have clearly mapped out copying boundaries. If copying cannot be shown, access must be proven.

Now consider a computer suit, Midway Manufacturing Co. vs. Dirkschneider (July 1981). A designer and manufacturer of coin-operated video games obtained copyright registrations on its Galaxian, Pac-Man and Rally-X games. It asserted that the defendant's actions constituted an infringement of these established rights. Among the elements of this infringement action was the question of copying. The games can be copied by electronically copying programmable read-only memory, which stores the information that produces the images and sounds of the game.

But what about access? The court acknowledged the difficulty of producing direct evidence of copying and stated that it is necessary to prove access to the copyrighted work. "In the instant case," the court surprisingly announced, "the similarities between the works are so striking that copying may be inferred without direct proof of access."

Frequently, an attempt to treat one child fairly is taken by other children

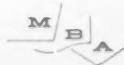
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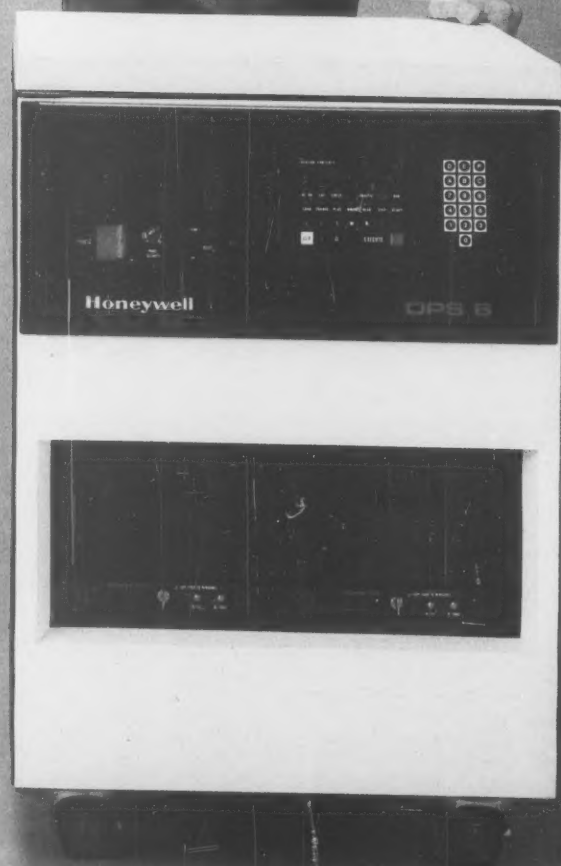
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as favoritism. In setting new boundaries by equitable principles, courts fall into a similar trap. Whether or not computer programs are a favorite of the law, it can be seen that in balancing the

equities, the copyright boundary has been extended.

The Chip Boundary

The U.S. Supreme Court considered copyright bound-

aries in 1907, in an action brought to alleviate the infringement of two copyrighted songs, "Kentucky Babe" and "Little Cotton Dolly" (White-Smith Music Publishing Co. vs. Apollo

Co.). The accused infringer, however, was not a song publisher, but a company selling player pianos and the perforated music rolls for them.

The rolls served a func-

tion somewhat similar to the chip in a computer. The rolls, when used in connection with the instruments, reproduced the melodies copyrighted by the music company. The music company argued that music is intended for the ear and the copyright laws cover all means of expressing these notes. The piano company, on the other hand, contended that while the copyright laws are intended to reward mental creations, the extent of such protection is a matter of statutory law. And the law extends only to copying tangible results of the mental conception — the sheet music. The court set forth the issues: Is the perforated piano roll a copy of the sheet music? Is it a copy at all?

The Supreme Court had to balance decisions holding that the physical form of a composition does not limit the copyright, against those stating that since copyright exists by statute, the limitations are imposed by the statute. The court maintained that Congress repeatedly had occasion to amend the copyright law and did not. It concluded that the rolls were not copies of the sheet music within the meaning of the copyright law. On the contrary, the rolls were parts of a machine that produced musical tones.

The question today is: Can computer chips be considered copies of copyrighted computer programs? In light of the piano roll decision, they cannot be. Chips are parts of a machine that, when operated, executes a program. The boundary is set. The copying must be the tangible embodiment of the intellectual product, the source code. A chip is a part of the computer.

Not so. In August 1981, in the U.S. District Court in California, this reasoning was used to argue that the chip was outside the boundary of copyright protection (Tandy Corp. vs. Personal Micro Computer). The defendants, on moving to dismiss the case, argued that read-only memory chips cannot be considered copies of a copyrighted program. "Therefore," the defendants declared, "there is no copyright infringement." The court, however, proclaimed that a silicon chip is a tangible medium of expression within the meaning of copyright law. "Copyrights can



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IN DEPTH

be infringed," the court pronounced, "by duplicating a computer program imprinted on a silicon chip." The court extended the "copy" property line.

The Object Code Boundary

Object code is output from a compiler or assembler in the form of machine code or in a form suitable for processing into machine code. The computer cannot run without it. Human understanding, however, is an element of copyrightability. Generally, at least a portion of the work should be visually perceptible without the aid of a machine. Since object code is machine-produced, who is the author of the coding?

Have the courts followed these principles in fixing the object code boundary? Should such coding be inside or outside the boundary of copyright protection? In 1947, it would have been outside the boundary and available for use by the competitor. In that year, a court ruled that if a machine was useless without written materials, these materials were, in effect, parts of the machine and not literature that could be copyrighted (Brown Instrument Co. vs. Warner). Those materials did not convey the thoughts of the author and, thus, were not eligible for copyright. The copyright laws, so the reasoning was at that time, were intended to protect the art or art form in writings. This intent would be frustrated if copyright law also encompassed mere information.

When the recent cases involving object code first arose, the courts set the boundary as would be expected in view of the 1947 decision. While acknowledging that the new definition of "copy" encompasses works that may be perceived with the aid of a machine or device, the courts declared that the Copyright Act of 1976 applies to computer programs only in their flowchart, source and assembly phases, but not in their object phase. In its object phase, the reasoning went, a computer program is a mechanical device lodged in a computer to become an essential part of the mechanical process.

As computer programs became more prevalent and more valuable, the boundary began to shift. After all, copyright areas of computer uses were not considered sufficiently developed for an ultimate solution. In August 1982, the U.S. Court of Appeals for the Third Circuit (in Pennsylvania) concluded that a computer program expressed in object code is copyrightable subject matter. "To hold otherwise would create an unlimited loophole by which infringement of a computer program would be limited to copying a program text," the court said in its decision (Williams Electronics, Inc. vs. Artic International, Inc.).

Since object code is merely a compiled source code, the creativity still exists. The copyright boundary was altered again.

The copyright boundary did not end with the ability to copyright unperceivable object code. A manufacturer of machines for processing silicon wafers for integrated circuits obtained copyrights on his source code and sued several of his former employees, using object code, for copyright infringement. The ex-employees declared that copyrights on unpublished source code do not protect uncopyrighted object code. In its July 1982 decision in GCA Corp. vs.

Chance, the court reasoned that "because object code is the decryption of source code, the two are to be treated as one work; therefore, copyright of the source code protects the object code as well."

By coming up with a decipher theory, the court further extended the object code boundary.

The Fixation Boundary

It has been generally acknowledged that, for a work to be a writ-

ing, it must be in a tangible form. Copyright laws, so it is alleged, concern a physical rendering of the intellectual or aesthetic creation. In order to determine copyright infringement, some permanent material must exist. The material must be fixed. With television in view, the Copyright Act of 1976 states that "a work consisting of sounds, images or both that are being transmitted is 'fixed.'" The act allows a work to be fixed if it is perceived for longer than

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a transitory period. The House of Representatives report (No. 94-1746) accompanying the act does not, however, appear to extend this TV concept to computer games. The report emphasizes that the definition of fixation excludes purely evanescent or transient reproductions such as those projected briefly on a screen, shown electronically on a television or other CRT or captured momentarily in the memory of a computer.

It seems that the fixation bound-

ary has been clearly established by the House report. It can be argued that the boundary excludes the Pac-Man and Galaxian "ephemeral" projections on a CRT. In *Midway vs. Artic International, Inc.* (June 1981), the defendant contended that Galaxian cannot be fixed because movements of the images on the screen are responsive to the movement of the player. The plaintiff, on the other hand, asserted that the playing mode consists of a fixed sequence of images

that play in a loop of approximately one minute's duration.

This argument appears inconsistent with the House report. However, a district court in Nebraska declared that the audiovisual displays were entitled to protection — even when computer programs upon which they are based were not copyrighted.

The videotapes submitted for the copyright registrations showed the works to be audiovisual, intended to

be shown by machines or devices such as projectors, viewers or electronic equipment. The fixation boundary appears not to have been set with the intent of the legislature in mind, but with a basic moral view of copyright law (*Midway vs. Dirkschneider*).

The copyright law is designed to reward creative and artistic endeavors. Another seeking to reap the benefits of this effort is harvesting his neighbor's crop.

The Idea-Expression Boundary

The boundary of copyright protection does not extend to abstract ideas, but only to the expression of the idea. The ideas themselves must be available to everyone. It is only when an imitator goes beyond the idea and borrows its expression that he is an infringer.

"Romeo and Juliet" is a classic example that it is not the idea, but its form or expression, that can be copyrighted. Many plays with the "Romeo and Juliet" theme have appeared.

To view the law in any other way was believed to constitute a withdrawal of ideas from the public domain. Copyright protection is granted to persuade authors to make their ideas freely accessible. The idea, then, should be outside the boundary of protection. This is the boundary line the Supreme Court has been asked to examine in the case of *Atari, Inc. vs. North American Phillips*.

To exemplify this "substantial similarity" issue, the appellate court in the Atari case considered a prior case involving a copyrighted bee-shaped jeweled pin (*Herbert Rosenthal vs. Kalpakian, 1971*). Obviously, many bee-shaped pins can be made. But the copyright owner disavowed a claim to these other pins, seeking to protect only his particular design.

With this case in mind, the court in the Atari case began its comparison. "K.C. Munchkin," it said, "not only adopted the same characters, but also portrayed them in a manner which made K.C. Munchkin appear substantially similar to Pac-Man."

The court concluded that this was not a case in which only the idea of the game was adopted. The court seemed to feel that the game's unique form of expression was also used. The defendant appears to believe that the boundary has been extended beyond expression so the idea is not available. The Supreme Court may well set this boundary.

In the final analysis, it appears that the copyright wars ultimately will be settled on the basis of uniqueness and creativity. The amount of protection will depend on the degree of originality in contrast to images and imitations.

About the Author

Norman L. Wilson Jr. is a patent attorney in St. Louis. He works on government software agreements and computer patents.

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Team Planning

How to set up a collaborative environment that brings big rewards in management productivity.

By Donald Gertsman

For decades, managers and scholars have been seeking ways to improve productivity by altering behavior or improving efficiency. The only certainty at this point is that there is no single right way to address this issue.

Productivity is typically defined as the ratio of work performed during a specific period. It is normally measured in such terms as pieces produced, sales calls made or lines of code written per hour, day or month. Productivity standards typically measure the activity of "doers" rather than managers. Managers rarely consider their own productivity; instead, they concentrate on extracting output from others. As a result, they seldom have time to do all the things they need to do and often end up doing the wrong things.

Since normal productivity measurements do not apply to managers, the key to management productivity is to determine the most important managerial tasks and then to determine the most effective, efficient way to perform them. This is planning in its most basic form.

Planning is one key to management productivity; thus, finding effective ways to plan should be a high priority. Unfortunately, few organizations focus on the actual process of planning. This article presents a team planning

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methodology that, if properly implemented, can have a significant effect on both productivity and achievement.

Definitions

The terminology used in the planning process often leads to confusion, because the terms are not used consistently or defined in sufficient detail to ensure clarity. The definitions here are often found in other literature on planning. Each manage-

ment team must agree to a set of terms and must use them consistently. The definitions that follow are used in this discussion:

Planning. The first of the five classical functions of management (the others are organizing, staffing, directing and controlling), planning is designing a desired future and developing effective ways to bring it about.

Goals and objectives. These are the most confusing of all planning

terms, because about half of the people use goals as the broader of the two terms, while the others use objectives. This article defines these terms as follows:

- Goals are general, long-term and relatively stable. Their attainment is often beyond the time frame of a plan. Changes in goals are usually an indication of a major change in the direction or the value system of an organization.
- Objectives are specific, short-

range and change frequently. They are measurable, time-oriented and attainable within the scope of a plan.

Strategy. A strategy is a broad course of action that translates goals into objectives. For example, if a goal is an increased data processing user base, a strategy might be to implement new inquiry systems. Specific objectives might include application selection, establishment of a new organizational structure to staff the new applications and so on.

Tasks. These are activities that support the achievements of objectives. In order to establish new applications in the previous example, tasks would include identifying alternative needs, performing cost-justification studies on each area, identifying other factors that might affect the selection and selecting the specific application area to be recommended to management.

Action programs. Objectives and tasks often combine to form the basis of action programs.

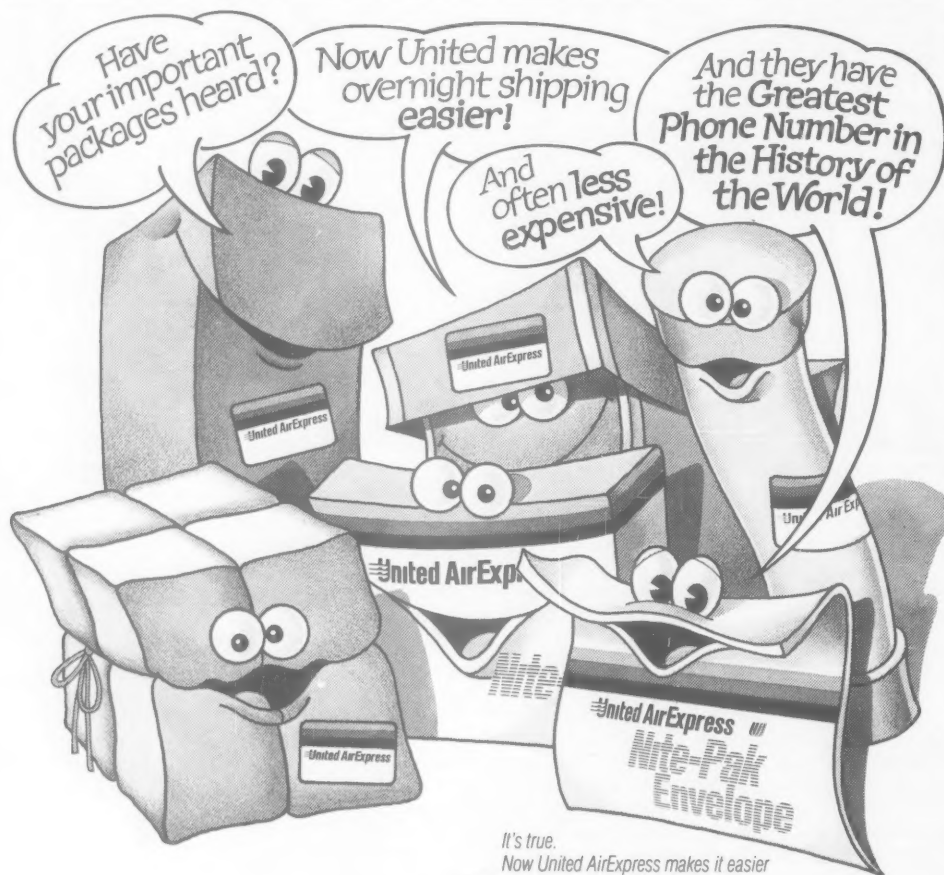
Team Planning

If planning is the design of a "desired future" and of effective ways to attain it, then it is helpful to understand the ways in which people try to create such a design. In DP organizations, planning is usually carried out by the senior DP executive, a planning officer, an outside consultant or a team responsible for executing the plan.

Senior DP executive. The DP executive describes, often in fulsome detail, what other people in the organization must do to ensure success. This method was very popular years ago when managers tended to be more authoritarian, and it is still seen today when the DP manager has an autocratic style. The DP manager may have a general perception of where he wants the organization to go; however, he does little to ensure that the plan has the support and commitment of the people who must execute it. In many cases, the DP manager ends up saying, "If my people were good enough to execute the plan, we would really be in good shape."

Planning officer. Use of the planning officer approach has increased during the past few decades. Recognizing that he does not have the time, skill or inclination to develop a plan, the DP executive transfers planning responsibility to a staff assistant or subordinate manager. This person is responsible for defining the objectives of the DP organization and for outlining the role of each functional area. This information is then integrated into a plan.

Unfortunately, the result of this process is too often a plan with very little input or commitment from the rest of the DP organization. Obviously, the planning officer cannot execute the plan alone. Once again, the people who must execute the plan either do not understand it or are not committed to it. A staff planning



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function can be an important part of an organization, but it serves better as a catalyst and coordinator, rather than as the creator of the plan.

Outside consultants. While the outside consultant method may result in a beautifully bound volume entitled, "Long-Range DP Plan," the volume usually remains on a shelf collecting dust.

An outsider can bring valuable objectivity to the planning process. This method, however, suffers from

the same problem as the preceding ones: There is little internal commitment from those who must implement the plan. More importantly, when the plan prepared by the consultant becomes outdated, as any plan will, the skills necessary to modify and update it will usually not be available internally. A consultant can serve a very useful function in assisting in developing the plan or in reviewing the plan itself, but it is much better to involve all the mem-

bers of DP management in the planning process.

Planning team. During team planning, the people responsible for implementing the plan also create it. This approach acknowledges that planning is a fundamental responsibility of each manager and that a management team must work together to ensure that the plan serves the organization's needs. In an environment of effective collaboration, individuals tend to use the organiza-

tion's resources in the best interests of the organization, rather than in creating provincial plans serving only a small segment of the organization.

Team planning, like any other planning method, is best accomplished through a coordinated effort. Plan integration and execution are far easier when all groups create their plans in a consistent fashion and at approximately the same time.

Basic Approaches

There are two basic approaches to team planning. While there is no strict division between these two approaches, it is possible to classify them as behavioral and issue-oriented.

Behavioral programs. The behavioral approach focuses on how individuals act within the organizational structure, and it often attempts to assist them in becoming more effective not only as managers, but also as individuals. These programs are sometimes referred to as sensitivity training and are often conducted by industrial psychologists. After discovering why individuals or organizations have not been functioning as effectively as desired, these programs identify the steps necessary to improve the working relationships.

This type of training is extremely effective in some cases, but it is not without risks. Some individuals may feel uncomfortable and may resent participating in a behavioral program. In addition, such programs focus on changing behavior, rather than on gaining a clear understanding of the issues confronting the organization. While individuals can gain much from participating in sensitivity programs, it is probably better that they do so as individuals rather than as part of a management team.

Candor is a vital part of a behavioral program, and the problems that can arise when an individual decides to unburden his soul are often too great for an organization to handle. If a behavioral program is needed, it should be kept separate from business planning issues.

Issue-oriented programs. Emphasizing issues can bring about some useful behavioral results. People who seem to have antipathy for one another sometimes find that it is not their personalities that have been causing the problem, but the roles they have been playing. Creating an environment that fosters teamwork often dissipates this kind of friction and allows all individuals to focus their energy on the same goals.

Planning issues in most organizations are so complex that the energy of all individuals involved is needed to clarify them. Concentration on clarifying these issues can result in two benefits. First, individuals who are apprehensive at the beginning of the program realize that they can be far more comfortable and make a far greater contribution, because they

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are not worried about protecting themselves. Second, the focus is not on trying to find out why something did not happen and who was responsible for the failure: It is on acknowledging that something new must take place in the future.

While meetings associated with the team planning process are issue-oriented, the need remains for sensitivity to individual reactions or to behavioral problems among some members of the group. It is the job of a session facilitator to be sensitive to such intangibles. The facilitator must, however, steer clear of anything that smacks of sensitivity training to avoid the risks discussed previously.

Team Planning Environment

Planning is difficult work, and when a new methodology is used, it is extremely important to establish the proper physical environment. Leaving the work place for a few days is usually the best way to begin the planning process. The location chosen for planning should be:

- A nonthreatening environment.
- Far enough from the normal work environment that the participants are not tempted to go back to daily activities.
- Pleasant enough that the physical surroundings will not inhibit the planning process.

A conference center or an off-season resort is an ideal setting for beginning the planning process.

Participants must clear their schedules of all normal duties. All but emergency telephone calls should be discouraged. This prevents distraction and allows the team members to focus on the planning process.

Some DP executives balk at the idea of taking the management team off-site for several days, since they think that operations will suffer because no one will be left to run the shop. Experience shows that the opposite often occurs. When managers return from several days off-site, they often hear that things never went so well as when they were gone.

It is not a good idea to hold a planning session on a weekend. Having worked five days before the session, the team will face five more working days following its conclusion. Planning involves creative and analytical thought, which is hard for overworked or resentful people.

The room selected for planning should encourage easy conversation. A living-room setting with soft chairs and no conference table works quite well. A preferable environment is a first-floor room that looks out onto green and pleasant surroundings, but not onto something distracting, such as a swimming pool.

Casual clothing should be worn and time should be allowed for recreation, usually in the late afternoon. Most sessions include evening meet-

ings, since they help maintain continuity and encourage the participants to accomplish as much as they can in the short time available.

Selecting Participants

The most important consideration in choosing members for a team planning session is to ensure that they are, in fact, part of the team. If three division managers are asked to participate with their boss in developing a groupwide plan, the manag-

ers must be able to see beyond their provincial interests and view the development of the plan from their boss' perspective. If the managers attend the session only to further their own interests, four separate business units will be represented. This is not conducive to team planning.

This does not mean that the inclusion of representatives from several departments is undesirable. For example, if a DP organization conducts a management review, then manage-

ment from operations, systems development, systems programming and the other DP departments should participate. Their actions should be guided, however, by what is best for the entire organization. If one group meets its objectives at the expense of other groups, then the team planning process — and everyone involved in it — has failed. The session must be based on common interests and must result in a unified plan. This principle of cooperation

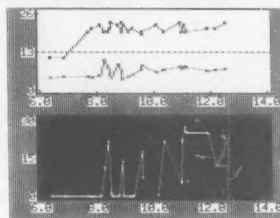
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IN DEPTH

must also be observed in project-oriented sessions.

The participants in a planning session should normally include those who will execute the plan. This helps avoid the "not invented here" syndrome. The optimum size for a planning team is six to 12 people. If there are too few, the interaction may be insufficient to generate the plan; if too many, some members may not be able to contribute.

An effective planning session

'During meetings of the planning team, think in binary terms — up/down, on/off, yes/no, black/white — not gray. Gray problems yield gray objectives, which lead to gray action plans. Unfortunately, these are seldom executed.'

must follow a set of ground rules. While each team must establish rules appropriate to its environment, the

following have been successful:

- Consider all team members as equals. This means that no one is

anyone's boss during the sessions. In addition, the senior members of the team must participate considerably less than they normally would, since people normally defer to them.

- Eliminate time limits and pressures. Do not, for example, schedule one hour for a specific topic. Issues can often be disposed of more quickly than expected, while others may take more time. Allow each issue to run its course in as much or as little time as required. This avoids both wasting time or closing discussions before issues are thoroughly resolved.

- Avoid artificial constraints. Think expansively, beyond yesterday's conditions. Often the mere presumption of a constraint can block creative thinking.

- Think in binary terms — up/down, on/off, yes/no, black/white — not gray. Gray problems yield gray objectives, which lead to gray action plans. Unfortunately, these are seldom executed. The team must focus on what is or what is not: A plan cannot be built on "maybes."

- Do not avoid issues. The purpose of a planning session is for participants to face issues and decide on a course of action. Participants tend to duck the issues if they feel a scapegoat is being sought, so it is important not to waste time trying to determine who is responsible for current problems. The important thing is everyone's dedication to making things go right in the future.

- Record the results of discussions in complete, simple sentences using action verbs. The ideas that result from each session must be easily understood during the session and clearly remembered later.

- Obtain unanimous agreement on each point in the plan. This is not an easy rule to follow. Since team planning is meant to build internal commitment, however, the rule is necessary. This is a key area of concern to the facilitator.

Some teams adopt other rules. For example, it is often helpful to allow only one person to speak at a time or to insist that a person who leaves the session cannot return (this avoids long explanations of why conclusions have been reached). While adherence to the rules is important, the team must use discretion in deciding how stringently to enforce them.

Sample Agendas

Most planning sessions fall into one of two categories: management review sessions and project-oriented sessions. During the management review session, the DP organization attempts to identify the issues critical to its success. The number of issues discussed may be small or large; There are no constraints in defining the issues. A project-oriented session, on the other hand, is confined to one issue — for example, developing a long-range information systems plan, hardware plan, network plan or staffing plan. The key to the suc-

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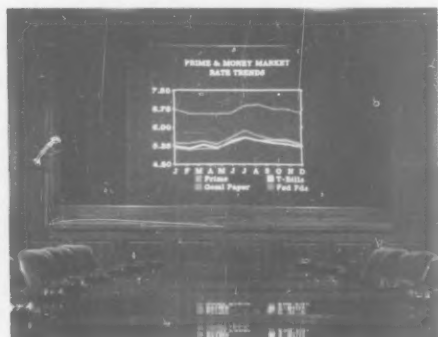
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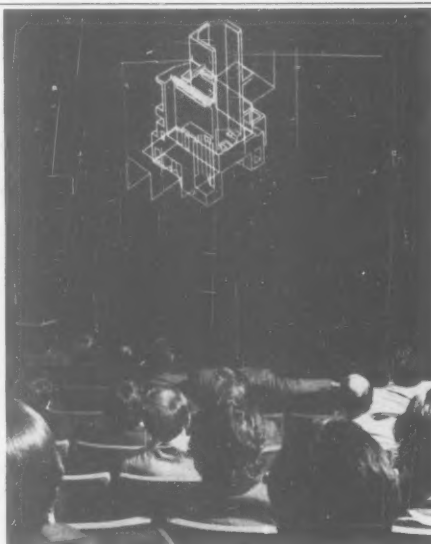
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Call or write: General Electric Company, Projection Display Products Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152.



IN THE BOARD ROOM at Mellon Bank, N.A. Pittsburgh, General Electric projector displays data for board review and discussion.



IN ENGINEERING: General Electric projector displays computer-assisted design for Engineering Society of Detroit seminar.



IN GOVERNMENT: General Electric projector displays amendment for Florida State Senate to inspect before voting.

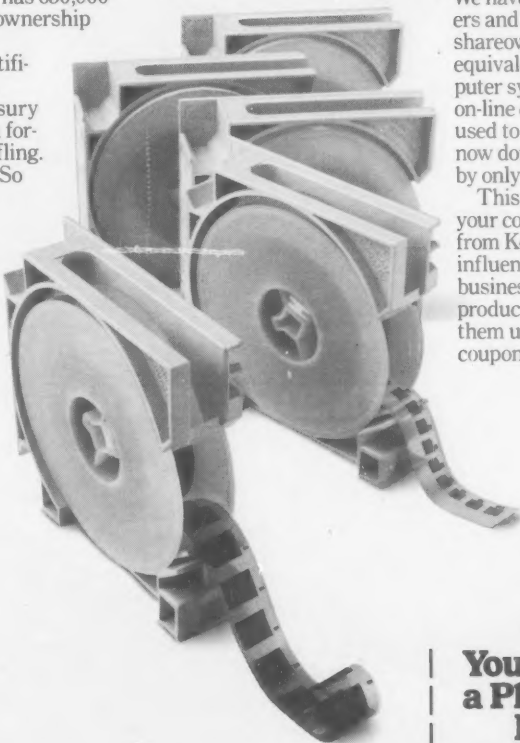
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IN DEPTH

cess of a project-oriented session is defining parameters before the session begins. A management review requires a different agenda.

Some managers sense a need for both types of sessions and they are often correct. If so, the question is which type should be first, because it is difficult to conduct both at the same time. There is no hard-and-fast rule regarding which session to hold first, but the following suggestions can help the management team make this decision. If the team is faced with numerous problems or has not been effective in achieving past objectives, major problems in the management system may need to be addressed. It is foolhardy for the team to try to establish a new project before alleviating such problems; therefore, the management review process should be conducted first.

For example, a management team was already working on a set of objectives when it participated in a management review planning session. The team validated most of the existing objectives, but it also developed four new high-priority objectives. Careful examination revealed that these four objectives were actually blocking the progress of the other eleven. Thus, it is often valuable to make a management review session the first step in the planning process.

On the other hand, a team faced with a pressing high-priority need may decide to hold a project-oriented session first. Although the broad management issues cannot be avoided forever, this strategy acknowledges the reality of today's problems.

In any case, each type of session requires significant time and attention and both types should never be crowded into one agenda or planning session. The most likely result of such crowding is that neither planning effort will be successful.

Management Review

The objective of a management review session is to identify the issues the team must address. The issues might include removing existing problems or capitalizing on future opportunities. This type of session usually includes the senior DP executive and all individuals reporting directly to him. Other individuals may be

included. Care must be taken not to slight someone by leaving him out. The basic agenda for a management review includes:

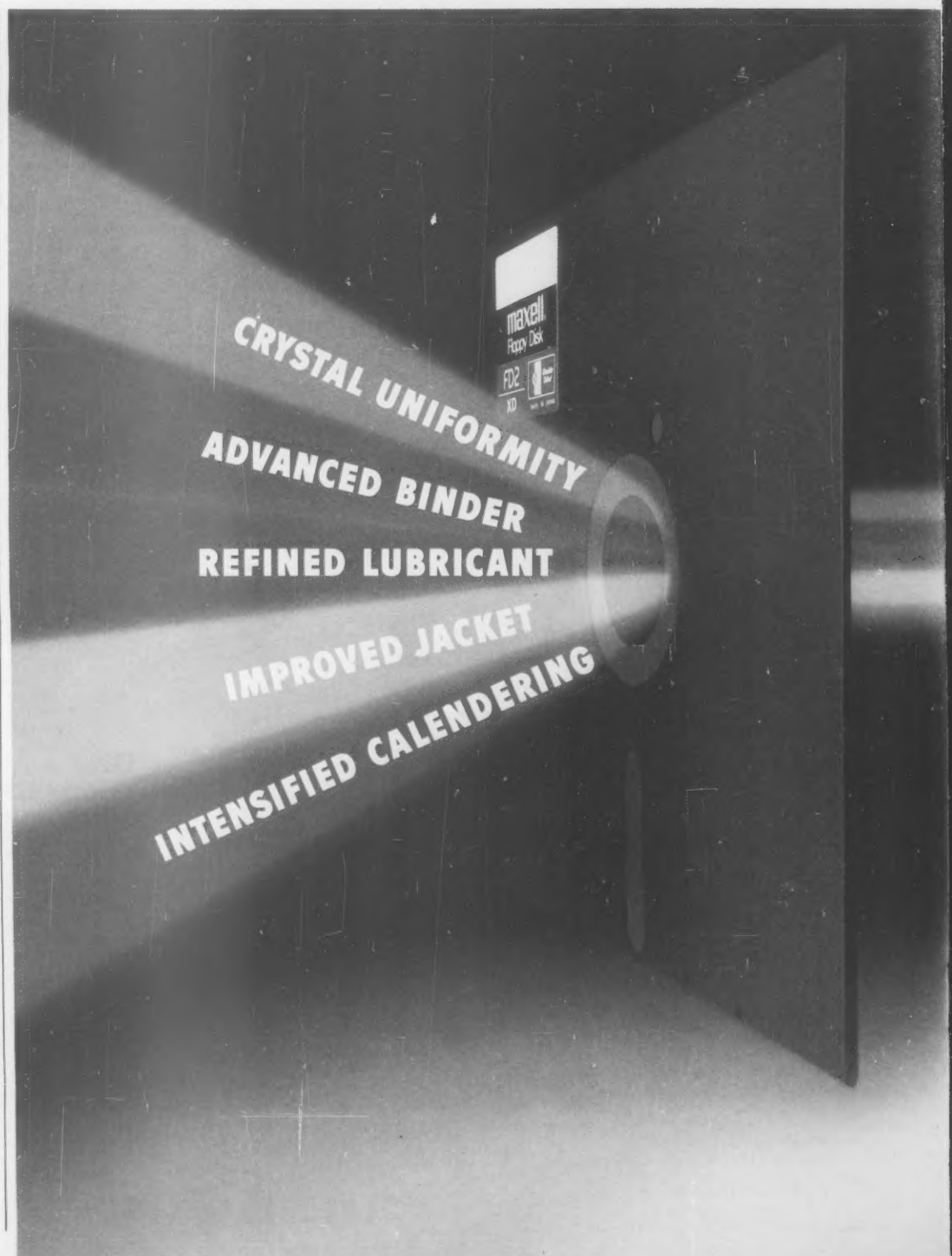
Introduction. The introduction establishes the agen-

da and the planning rules. Individuals can ask questions about the direction of the session and a positive tone should be established. If a facilitator is used, this introduction enables him to

develop a rapport and to establish his credentials.

Present structures. The senior DP executive should not comment during the discussion of the organization's present structure, because

this is his chance to see how the staff feels about the organizational structure. During this discussion, the facilitator might ask such questions as: Is this how it really works? Why was this structure se-



IN DEPTH

lected rather than some other one? Is the structure consistent with the organization's strategy? These questions help clarify the present status of the organization and they also prompt

discussion and establish an open atmosphere.

Problem definition. The third item on the agenda is defining the problems the organization faces. An experienced facilitator can be ex-

tremely effective in this area. After each individual has raised any issue that he desires, the team agrees on a set of criteria defining what a problem is. When describing problems, it is not enough

merely to state a condition. The team must also describe the objective the condition prevents them from achieving. The form of a problem statement, therefore, is: Because of X, we are unable to

do Y. This ensures that the cause-and-effect relationship is well-defined.

For example, instead of merely stating that DP staff turnover is too high, the team should say, "Because turnover is too high, we are unable to staff critical applications development teams." The second part of the statement helps the team understand the nature of the associated objective. Without this understanding, the team may end up with programs that are unjustified or that fail to meet the underlying need.

Defining objectives.

There are three basic classes of objectives: problem-oriented, opportunity-oriented and basic management objectives.

Problem-oriented objectives are merely a restatement of the problems the team has just defined. Using the previous example, the objective might read: "Reduce DP staff turnover to a level that will enable us to staff all high-priority application teams." In this example, the objective should start with an action verb, then describe the "what" in the first half of the sentence and the "why" in the second half.

The other two types of objectives use the same format, although they are not based on the need to overcome a problem.

An example of an opportunity-oriented objective is: Establish a graphics support team to ensure that we can take advantage of potential productivity improvements when new graphics technology is installed.

A basic management objective is: Establish a program to deliver this year's committed systems on time and within budget in order to meet this year's management-by-objective goal.

After completing this part of the agenda, the team can list the identified objectives. This is vital for a number of reasons. First, it enables the team to select from a series of potential objectives. There are always more things to do than resources with which to do them. Listing the objectives enables the team to allocate deliberately scarce resources for the most important objectives. This, more than any other step, is the secret to successful planning — not just doing things right, but doing the right things.

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IN DEPTH

ACTION PROGRAM CONTROL SHEET		REVISION NO. 1	OBJECTIVE NUMBER 19	
ISSUE Accountabilities		REV. DATE 6/8	COORDINATOR McKinney	
STATEMENT OF OBJECTIVE Establish specific measurable accountabilities for each of the DP functions in order to ensure that expectations are consistent with the ability to perform and to provide clarity where shared responsibilities exist.				
TASK NO.	TASK	PERSON RESPONSIBLE	DUE DATE	DATE COMPLETED
1	Determine units for which accountabilities will be established.	Foster	6/8	6/8
2	Determine the types of accountabilities that can be assigned (e.g. cost performance, schedules met).	East	6/8	6/8
3	Create a matrix with accountabilities on one axis and functional units (including support areas) on the other.	McKinney	6/8	6/8
4	Request that the manager of each unit for which accountabilities will be established fill in the matrix showing whether (a) he or she is accountable, (b) accountabilities are shared, or (c) he or she is not accountable.	McKinney	6/8	6/8
5	Have the managers prepare a separate sheet of paper for each item where an accountability exists, describing the activity for which they are accountable and the measurement for that activity.	McKinney	7/15	
6	Consolidate the responses from the managers, and produce a completed matrix identifying inconsistencies, omissions, etc.	McKinney	7/17	
7	Review the output with the DP manager, and revise as appropriate.	McKinney	7/17	
8	Return the matrix and accountability description to the managers for comment.	McKinney	6/15	
9	Resolve differences.	Foster/McKinney	6/29	
10	Approve final accountability documents.	Foster	7/2	
11	Revise organizational alignments to ensure consistency with accountabilities.	Foster	8/28	
12	Revise performance plans to ensure consistency with accountabilities.	Foster/Management team	10/30	

Figure 1. Sample Action Program Control Sheet

jectives rather than a list of problems changes the team members' philosophical viewpoint. Instead of being reactive problem solvers, they are proactive achievers. People who call themselves problem solvers acknowledge that someone else is pulling strings and that they are not in control of their time or efforts.

Selecting priorities. A good method for selecting priorities is simply to let each team member vote on the objectives. A high/medium/low ranking system works best. There is a tendency to rank too many objectives as medium, but at least this method points out the things that must be handled immediately. Of course, even low objectives are important. The team must, however, focus on things that must be done, rather than on things they would like to do. A set of criteria for selecting objectives can be useful in this regard.

At first, the team should limit itself to four to eight objectives, since the tasks that must be completed to meet those objectives are usually added to the team members' normal job responsibilities. Burdening these people with an unreasonable amount of work can doom the plan to failure. As experience is gained and initial achievements are realized, new objectives can be added.

Action programs. An action program is a logical method of executing a plan by breaking down an objective into specific tasks. Once this is done, responsibilities are assigned to each of the tasks and a schedule of dates is established. Figure 1 is a typical action-program control sheet. The last column can serve as a tool for managing execution. The last item on the agenda is establishing a technique

for managing the action planning process, which is discussed later.

Project Planning Session Agenda

A project planning session is held to establish a plan for a specific project — for example, the development of an information systems plan, a DP facilities plan, a new graphics marketing program or an implementation program for a specific DP project. All these activities have two characteristics in common: They normally have discrete starting and ending points and one person is usually given responsibility for the activity. The project planning agenda has several similarities to the management review process. The introduction is essentially the same as for a management review.

Defining the mission. In defining the mission for which the task force has been convened, each person in the group should assume the point of view of the project manager and should not be concerned with the role he will play in the project.

In nearly all cases, the mission statement is one complete sentence, which should be free of prejudice. An example of a narrow mission statement is: Develop a plan to implement the new ABC computing system. A broader statement, far more relevant to the needs of the organization, would be: Create an information resource management plan that will provide accurate, timely, easily accessible information to facilitate decision making, control and reporting during a period of rapid growth and diversification.

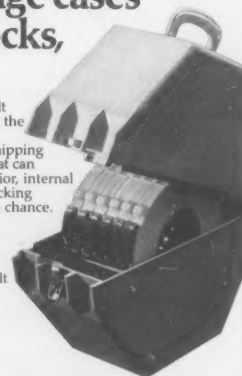
Establishing purpose. Next, it is necessary to establish the session's purpose. At first, this may appear to

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TEAM PLANNING

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be the same as the project team's purpose, but there is a significant difference. The latter defines where the team wants to be six to 12 months later, when the project is completed. The purpose of the session defines where the team wants to be two days later.

Including the words "create a plan to" in the mission statement defines the purpose of the session. This may seem trivial, but most teams have trouble distinguishing between actually executing the plan and defining the process needed to execute the plan. This simple step eliminates this problem by specifically asking the team to describe the process for executing the plan.

Identifying project elements. Because projects are normally rather large, it is appropriate to break them into major sections before proceeding to the task level. These major items are called elements.

The elements are identified by asking each person to state what he thinks must be accomplished to complete the project. This procedure provides for maximum input from the team members: An individual can seldom do a better job defining tasks than can the team as a whole.

Pert network. The next step is to develop a performance evaluation and review technique (Pert) network to show the predecessor/successor relationships for execution of the elements (see Figure 2). The notation in this figure has been modified for simplicity.

Redefining elements. The Pert chart provides a context for the elements.

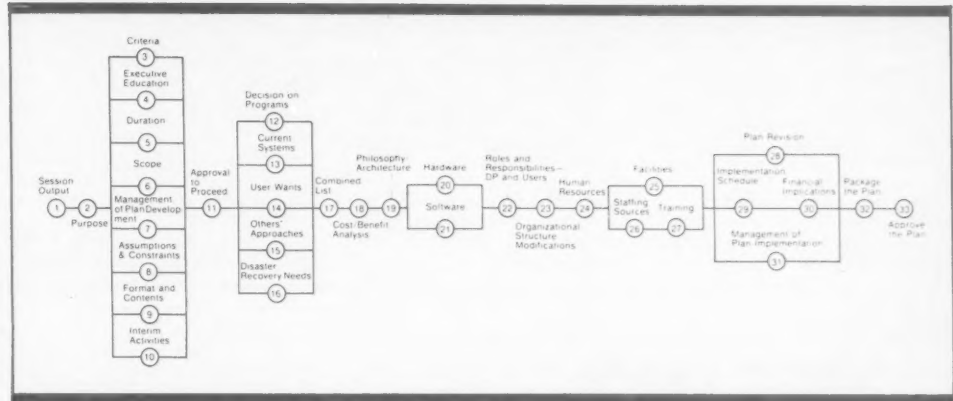


Figure 2. DP Planning Pert Chart

ments. It is necessary to redefine the elements by combining nearly identical activities and determining the basic activity that must be accomplished within each element. This is a vital step in the process and can usually be accomplished quickly.

Implementation schedule. Once the redefined elements are accepted and the Pert network is finalized, the team gets its first overview of the project and can establish a preliminary timetable. This can be accomplished either by forward scheduling (assuming no time constraints) or back scheduling (assuming a deadline for project completion). A combination of forward and back scheduling is usually best. Dates can be added to the Pert chart to indicate when the elements must be done.

Action programs. As in the management review, the development of action programs entails establishing the specific tasks within each element, along with responsibilities and due dates. Figure 3 is a typical action-program control sheet for an element of a project plan.

Managing plan development. Establishing a process to manage the plan's development ensures that the necessary resources are allocated, at least for the first parts of the plan, and defines the review process for ensuring that the plan remains on schedule. Weekly, biweekly or monthly review meetings should be scheduled. These meetings should involve the implementation task force, which is not necessarily the same as the planning task force (although it is advantageous for as many of the implementors as possible to participate in the planning).

Role of Facilitator

To ensure success, it is important to appoint someone to act as facilitator for the meeting. This person must

understand the planning process, have experience leading such meetings and be able to gain the respect of the participants. In addition, the facilitator must not appear to have a vested interest in the outcome (other than the desire to ensure that the plan produces the expected results).

In a management review, using an outsider with these attributes can be beneficial. Many sponsoring executives have remarked that, even though they used essentially the same agenda, the session without a facilitator became just another staff meeting. This often occurs because the senior executive unintentionally dominates the session.

A facilitator can help the senior executive play a low-key role much more easily than someone who works within the organization. This low-key role is vital to ensure full participation by the other team members.

A facilitator can also encourage reluctant members to participate more and, with enough experience, can tell the difference between a true

ACTION PROGRAM CONTROL SHEET				
ISSUE		REVISION NO.	OBJECTIVE NUMBER	
Determine the Scope and Duration of the Plan		1	12-4	
COORDINATOR		REV. DATE		
Hoffman		5/12		
TASK NO.	TASK	PERSON RESPONSIBLE	DUE DATE	DATE COMPLETED
1	Determine which functional departments should be included in DP planning.	Hoffman	5/13	
2	Determine which functions, technologies, or activities should be included in plan: information systems, telecommunications (voice and data), COM, reproduction, automated office (word processing, electronic mail, etc).	Hoffman/ Robertson	5/13	
3	Review statement of scope and obtain approval.	Hoffman/ Task Force	5/20	
4	Determine longest lead time to acquire resources for implementing information systems.	Smith/ Johnson	5/14	
5	Specify planning horizon for each aspect of the planning process: architecture, hardware/software, application development & planning, implementation schedule.	Johnson/ MacDonald	5/15	
6	Distribute for review and comment.	Hoffman/ Smith	5/16	
7	Review and comment on selected scope and planning horizons.	Hoffman/ Task Force	5/20	
8	Resolve any problems, modify and prepare presentation material.	Hoffman/ Johnson/ Smith	5/22	

Figure 3. Sample Action Program Control Sheet for Project Plan Element

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agreement and one in which some members gave in to stronger members.

Even the project planning session can benefit from an outsider, because the role of project manager often does not exist within the organization and it is hard for all individuals to think in terms of this role. Most importantly, the facilitator can ensure that the team members' creativity is drawn upon at the beginning of the planning process, so that the out-

put is not just another business-as-usual plan.

Whoever facilitates or leads the session must always remember that the session belongs to the team rather than to the senior DP executive or the project manager. The facilitator's responsibility is to supply a methodology, keep the session moving, manage the time, encourage members when necessary and control them when appropriate — but not to dictate the output.

Implementation must follow effective management principles. After the first step — planning — the organization must organize effectively in order to establish a structure to support the plan. Execution of a plan is much more difficult if the organizational structure is at odds with the strategies involved or if the lines of authority are misunderstood or poorly defined.

Staffing is also vital, since a plan must be supported by the appropri-

ate people. Nothing is more frustrating than increasing a full-time employee's work load by half as much he had before the plan was developed and expecting him to complete it all successfully.

The integrity of the organizational structure should not be violated. If people outside the scope of the normal organizational structure are assigned to the project or to specific task forces, their managers must be advised. This seems obvious, but this step is sometimes forgotten in the initial enthusiasm of the action programs.

Controlling Implementation

As mentioned before, periodic progress reviews should be held. For large projects, daily meetings may be appropriate; in other cases, weekly, biweekly or monthly meetings might be better. For the management review process, between 15 and 30 minutes should be allocated during a monthly staff meeting to check on the status of the activities managed by the plan.

The purpose of these meetings is not to discuss the content of the action programs in detail. It is to determine whether things are on schedule. They also provide an opportunity to change the schedule or to delete or add objectives.

The reviews must be held at regular intervals. This keeps everyone aware that senior DP management expects results.

If schedule changes are necessary because of changing conditions, project members responsible for tasks following the one being deferred should be advised of the change so they can better allocate their work loads.

Team planning has been extremely effective in helping organizations achieve their objectives. Much has been written about the Japanese style of management, which uses some of these principles. While American value systems may be different from those of the Japanese, teamwork is not foreign to American sensibilities.

While still fostering the entrepreneur's desire for achievement, these planning techniques enable an organization to pursue its goals in a coordinated and cooperative way. To be effective, team planning must be part of the regular management process. Planning out of context is useless and can, in fact, cause significant damage, since it fosters a feeling of irrelevancy.

About the Author

Donald Gertsman is president of Gertsman & Associates, a West Los Angeles consulting firm specializing in data processing management.

Before starting his own firm six years ago, Gertsman worked for 17 years at IBM. In his consulting work, he has led more than 600 management planning teams at more than 200 companies in a broad range of industries.†

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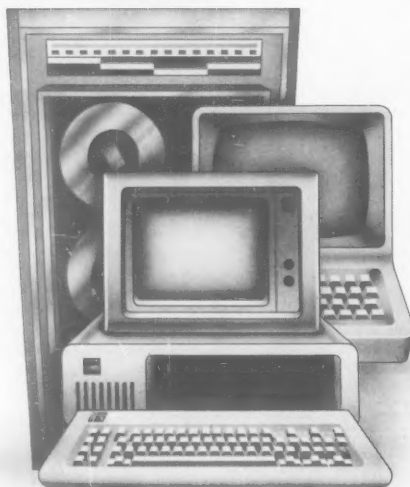
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Baby Bell Offerings Designed to Meet Processing Needs

MORRISTOWN, N.J. — American Bell, Inc.'s Advanced Information Systems has announced a six-pronged effort to address the internal processing and external transport needs of the office and larger business environments.

The offerings include the Dataphone Multiplexer, the Dataspeed 4420 and 4430 asynchronous terminals, the Comm-Stor Line Control Unit, the Teleprinter 1000 and a touch-screen version of its previously announced Dataspeed 4540 Terminal, the Dataspeed 4540 Touch Screen Terminal.

The Dataphone Multiplexer is said to allow as many as 24 ports to be concentrated onto one or two data channels at speeds of 9.6K bit/sec. The ports are individually programmable to accommodate a variety

(Continued on Page 73)

Forecast From 'Father of Packet Switching' Bandwidths Seen Going Down

By Jim Bartimo
CW Staff

BURLINGAME, Calif. — While most communications experts are preaching the need for higher bandwidths in voice communications, the father of packet switching believes that bandwidths will go down.

Larry Roberts, president of the worldwide courier service DHL Corp., said in an interview recently that higher bandwidths will become unnecessary when large-scale integration technologies and voice compression allow voice transmissions to take place over smaller bandwidths.

Predicting voice compression rates of 4K bit/sec by 1990, compared with today's standard 64K bit/sec, Roberts said, "If you analyze the trend in voice compression, you'll see that [the bit/sec rate] is decreasing."

Voice compression technology from AT&T and Satellite Business Systems can now allow voice transmission at 32K bit/sec, but implementation is not economically feasible yet, Roberts said. "By 1984, transmissions of 16K bit/sec will be attractive," he said.

Bandwidths will come down because al-

Systar Front-End Unit Targets IBM SNA Users

SAN JOSE, Calif. — Systar Corp. has introduced Lodestar, a communications front-end processor that reportedly provides multiple-switching capabilities and access to IBM System/34 and /38 data bases for users with IBM's Systems Network Architecture (SNA).

The multiple-switching capability of Lodestar introduces for the first time simultaneous host sessions, giving users the ability to log on in a single, day-long session, which covers rapid selectable access to all network-tied hosts, the vendor said.

Users from IBM 5251 terminals can switch back and forth to multiple IBM System/34 and /38 data bases at any remote location on the SNA network. In this way, multiple data bases directly communicate with dispersed terminal workstations, without being tied to a central mainframe.

Instead, all host and terminal lines physically connect to a single Series/1 mini-computer, communications-driven by Lodestar software.

Lodestar forms distributed networks of IBM System/34 and /38 hosts and 5251 terminals through conditioned leased lines. On the terminal side, it supports up to 150 remote devices, including all types of IBM 5250 printers through the fastest of the line, the 5225s, as well as seven multi-dropped leased lines. On the host side, it supports up to seven System/34 and/or System/38 data bases under Systar's standard application or by option, up to 14 hosts.

The Series/1 serves as the single communications processor to all hosts and devices across a Lodestar network. Lodestar couples the Model 11 cluster technique with multipoint lines to realize a maximum number of devices supported by the Series/1. The front-end then passes through the devices to each System/34 and /38 while occupying only one host port, realizing a maximum number of terminals supported by a System/34 and /38.

A Lodestar control center, the Network Control Console, reports the status of all terminals, lines and computers in the network, provides message broadcasts, displays usage statistics and allows for the network's dynamic reconfiguration without taking down the system, the spokesman said.

The cost of the product is tied to Systar's elevated program levels. Entry-level, standard and large-scale run from \$20,000 to \$50,000, including options, the vendor said from Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

though "users want more bandwidths for more things, they aren't willing to pay for it," Roberts said. Compressed voice will allow voice transmission at a lower cost and make room for other services on the line.

Roberts became known as a trend spotter and the father of packet switching when, from 1967 to 1973 he helped the Department of Defense develop Arpanet, the first packet-switched network. In the 1970s, Roberts founded GTE's Telenet Co.

That voice compression and large-scale integration technology will bring bandwidths down "is something very few peo-

(Continued on Page 72)

System Out for ITT Courier Users

HYANNIS, Mass. — Fibronics International, Inc. has unveiled a data distribution system for ITT Courier users said to transmit data two miles over fiber-optic cable.

The Fibronics FM-1680 Data Distribution System reportedly connects all 32 output channels from the Courier 7411 terminal controller via one standard, RG-62A/U coaxial cable. The FM-1680 unit reportedly operates with Courier's 2700 and 2790 terminals and Model 8700 printer.

The system's design features flexible network architectures in point-to-point, multidrop and star configurations. The system operates using a coaxial hookup to a maximum of 3,000 feet. A Fibronics fiber-optic interface permits data transmission up to 10,000 feet, the vendor said.

A full 32-port system is approximately \$10,000. Designed in eight-port increments, the basic system is priced in the \$6,000 range from Fibronics International, 218 W. Main St., Hyannis, Mass. 02601.

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Multidrop Concentrator Supports 16 Dumb Units

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced a multidrop concentrator said to provide polled terminal support for up to 16 dumb asynchronous terminals located in as many as 16 sites. The terminals are serviced by a single telephone line. No changes to hardware or software are necessary, according to a vendor spokesman.

The Micro900/2 Multidrop Concentrator allows both telephone line costs and modem costs to be reduced by using one multidropped

phone line instead of a different line for every remote site and by using a single modem at the host location, according to a vendor spokesman.

Master units are available with four, eight or 16 channels, starting at \$2,050 for the four-channel version. Node units are available in one-, two-, four- and eight-channel models, starting at \$900. More information is available from Micom Systems, located at 20151 Nordhoff St., Chatsworth Calif. 91311.

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ACC Aid Out for DEC Users

SANTA BARBARA, Calif. — Associated Computer Consultants, Inc. (ACC) has announced that its protocol package is now available for users of Digital Equipment Corp. machines. The package is compatible with the Xerox Corp. Ethernet controllers.

The Network Systems Protocol Package implements the Xerox network systems protocol in a layered manner, offering the application programmer the ability to name, locate and utilize high-level processing services in a distributed environment, a vendor spokesman said.

It is said to provide simple interprocess communications between distributed resources and a variety of local-area network hardware implementations.

Two versions of the pack-

age are available, ranging in price from \$4,500 to \$9,500. More information can be obtained by contacting Associated Computer Consultants, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

Class Offers Tool Guide

SAN JOSE, Calif. — The California Library Authority for Systems and Services (Class) has announced the publication of a guide detailing intelligent terminal software.

"Communications Software for Microcomputers" is said to respond to the widespread interest among librarians in using microcomputers for dial-up data base searching.

The publication reviews operational aspects of the software and other communications applications for microcomputers such as electronic mail, microcomputer-to-microcomputer file transfer and use of smart terminal software to download data into local files, according to Class.

The publication is available for \$10.50 for Class members and \$12.50 for all others. More information is available from Class, located at Suite 101, 1415 Koll Circle, San Jose, Calif. 95112.

Bandwidths Lowering?

(Continued from Page 71)
ple have thought about," Roberts said. "People tend to think in the short term. I analyze trends and that's how packet switching evolved."

When voice signals are digitized and compressed, the cost of voice transmission will drop. Since many other services will also be resident on the line by 1990, Roberts forecast that one of them will carry the major cost of the line.

"The mind-set right now is that voice pays the bill; that has to change," Roberts said. "A totally new entrant has to take over and become the predominant use. It could well be an entertainment service that would pay the bill."

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Will Switch to Bell Lab's Unix Arm Beefs Up Data-Net

FAIRPORT, N.Y. — Arm Associates, Inc. has expanded its Data-Net computerized electronic mail and in-

formation service.

Data-Net now provides electronic mail, classified advertising, electronic shopping, financial and game programs and Western Union, Inc.'s Mailgram service. The expanded system will also reportedly switch from Arm's operating systems to Bell Laboratories' Unix operating system in either a menu-driven, user-friendly format or at the operating system level. The user determines his format.

Terminal connect rates start at \$3/hour for 300 bit/sec users and go to \$4.20/hour for 1,200 bit/sec users. There is no initiation fee. The firm is located at 9 Clarkes Crossing, Fairport, N.Y. 14450.

Augat Unveils Data Link

ATTLEBORO, Mass. — Augat Fiberoptics, Inc. has announced a data link that can reportedly transmit digital data at rates up to 25M bit/sec.

With a 16-db system loss budget, the M25 allows data set controller transmission lengths greater than 2 kilometers. In addition, the unit reportedly can transmit an analog signal up to 10 kHz.

Two connector systems are offered, including the firm's data set controller designed to newly proposed Electronic Industries Association standards. The M25 data link costs \$440 from the firm at 40 Perry Ave., P.O. Box 1037, Attleboro, Mass. 02703.

Baby Bell Offers Six Products

(Continued from Page 71)

of synchronous and asynchronous equipment. The multiplexer will be available April 1 in eight- and 24-port versions for \$6,850 and \$8,450, respectively. Four-year leasing prices are \$250/mo and \$530/mo, respectively.

The Dataspeed 4420 for dial-up use and the 4430 for multipoint private lines are two buffered display CRT terminals said to offer flexible editing capabilities in a human-factor design. The 4420 is available now for \$4,800 or \$198/mo for a four-year lease. The 4430 will be available in May for \$5,700 or \$120/mo for a four-year lease.

The Comm-Stor Line Control Unit can operate in conjunction with a host computer or as a stand-alone unit, allowing users to prepare and send messages without tying up the mainframe processor, a vendor spokesman said.

The control unit will be available April 1 for \$21,500 or \$675/mo for a four-year lease.

The Teleprinter 1000 is a buffered printing terminal available in receive-only and keyboard send-receive configurations that features speeds of 120 char./sec. and 1,200 bit/sec. The printer is available now for \$185/mo for a two-year lease.

The Dataspeed 4540 Touch Screen Terminal is said to allow a user with no computer background or typing skills to communicate with a data base through the touch-sensitive screen.

By pointing to choices displayed on the screen, the user can ask for information, answer questions or make transactions, according to a vendor spokesman. The terminal is available now for \$5,000 or \$170/mo for a four-year lease.

More information about these products is available from American Bell Advanced Information Systems, 100 Southgate Pkwy., P.O. Box 1955, Morristown, N.J. 07960.

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Intelligent Modem/Dialer Out

MOUNTAIN VIEW, Calif. — An intelligent modem/dialer said to incorporate its own 8-bit microprocessor and capable of communicating data over telephone lines at speeds of up to 12K bit/sec is available from Cromemco, Inc.

The MDM-12000 is a full-duplex modem designed for direct connect. A single RS-232C port reportedly serves the dual function of control-

ling the built-in microprocessor's functions before entering the actual data mode and transferring data to and from the telephone after entering the data mode.

The MDM-12000 costs \$1,495 from Cromemco, 280 Bernardo Ave., Mountain View, Calif. 94043.

Nu Data Offers A720 Converter

LITTLE SILVER, N.J. — Nu Data Corp. has announced a protocol converter that provides up to 16K bytes each of read-only and random-access memory, two 8-bit parallel ports and up to three full-duplex serial channels.

The A720 reportedly features an RS-232C interface that supports asynchronous communications as well as character- and bit-oriented synchronous communications. Modular software is said to configure the ports to the application and emulate higher protocol levels.

The A720 costs \$1,650 from 32 Fairview Ave., Box 125, Little Silver, N.J. 07739.

Mux Line Aids Statistics Access

KIRKLAND, Wash. — Teltone Corp. has announced the M-860 line of statistical multiplexers said to offer composite link speeds of up to 76.8K bit/sec.

The units can be configured with between eight and 32 asynchronous input channels at individually programmable speeds of 50 to 9,600 bit/sec. Interactive menu-driven programming provides authorized personnel to access statistics and diagnostic routines, the vendor said.

An eight-channel RS-232C version costs \$2,400, the vendor said through P.O. Box 657, 120th Ave. N.E., Kirkland, Wash. 98033.

Link Extends RS-232C Cable

MINNEAPOLIS — Honeywell, Inc. has introduced the first in a series of fiber-optic data links. The RS-232C link is a plug-compatible replacement for most four- and nine-wire RS-232C extension cables.

The module HFM 5005 kit provides a method of extending cables beyond the 50-ft limit of a standard RS-232C while eliminating ground loops and providing electromagnetic interface/radio frequency interface resistance, data security and reduced error rate. The link supports full-duplex asynchronous data rates up to 56K bit/sec.

Each HFM 5005 kit includes transmitter, receiver and power module for \$165.

More information is available from Honeywell Optoelectronics Division of Honeywell, Inc., 830 E. Arapaho Road, Richardson, Texas 75081.

Color Graphics Terminals Unveiled for Univac 1100

NORCROSS, Ga. — Intecolor Corp. has introduced two color graphics terminals said to operate with the Sperry Univac application generator, Mapper, for users of the

Univac 1100 series. Both terminals emulate and are plug-compatible with the U-200 protocol.

The Intecolor 9001R/M is designed for industrial use, the 8001R/M for office use. Both terminals feature support of 16 terminals clustered on a Univac multiplexer, eight foreground and eight background colors, 32K bytes of random-access memory, two asynchronous RS-232 channels and one synchronous channel, a vendor spokesman said.

The 9001R/M is available for \$6,350, the 8001R/M for \$3,995 from Intecolor Corp., Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

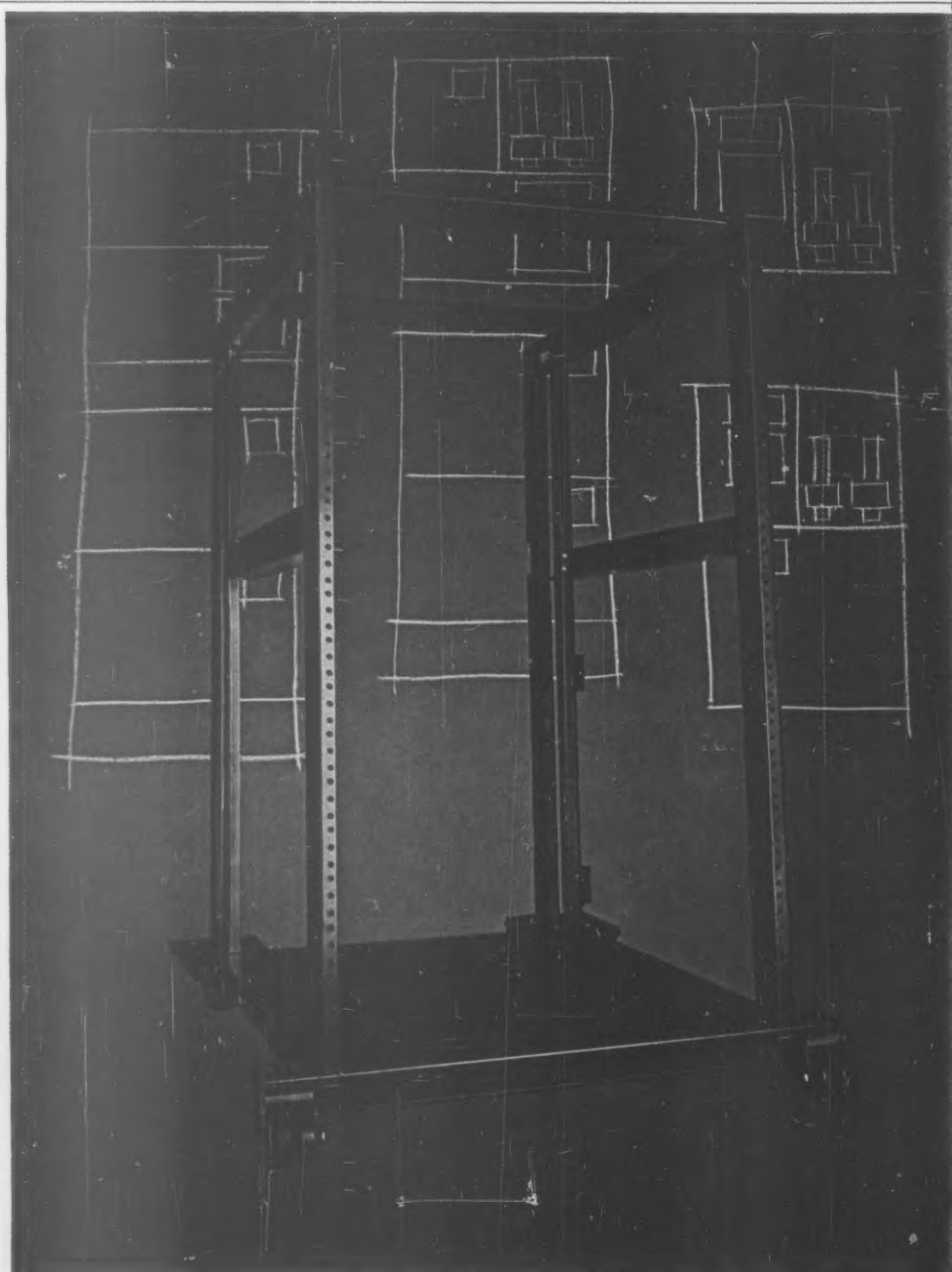
Local Data Upgrades Datalynx

TORRANCE, Calif. — Local Data, Inc. has upgraded its Datalynx 3270 protocol converter to include hard-copy keyboard-send-receive (KSR) terminals among the asynchronous Ascii devices that can be operated with a binary synchronous host.

A plug-in Paper/3278 firmware module is available for \$50 to retrofit Datalynx/3270s now in use. The pro-

tol converters are said to make any 80-col. or 132-col. KSR terminal appear to the host as an IBM 3270 display terminal.

Prices of Datalynx remain the same as before the upgrade: \$1,450 for the Datalynx/3270 and \$4,000 to \$6,000 for the Datalynx/3274. Local Data is located at Suite 706, 2701 Toledo St., Torrance, Calif. 90503.



Enhancement Announced For RAV/Chips Module

NEW YORK — RAV Communications, Inc. has announced a new release of its RAV/Chips Module telecommunications software for interbank and international money transfer.

Release 2.1 enhancements relate to book transfers, verification/release, payment entry and repair and communications. The improvements are said to provide smoother operation between the bank and its financial clearinghouse.

The RAV/Chips Module is part of a turnkey system based on a Texas Instruments, Inc. DS 990 Model II computer with 64K bytes of memory, two TI 810 150-char./sec bidirectional

printers, two CRT terminals and a 64K-byte communications processor. The system is priced at \$60,000 or \$95,000 for two systems, from 90 West St., New York, N.Y. 10006.

VIA Directors Announce Officers

WASHINGTON, D.C. — The Board of Directors of the Videotex Industry Association (VIA) has elected its officers for 1983-84.

Reelected as chairman was Larry T. Pfister, vice-president of Time Video Information Services.

Incoming officers are Samuel Berkman, vice-chairman, who is division manager of product develop-

SACRAMENTO, Calif. — Selanar Graphics Corp. has announced its SG480 graphics upgrade for Digital Equipment Corp.'s VT100 series alphanumeric terminals.

The SG480 graphics upgrade reportedly is patterned after Selanar Graphics 100 products and features

ment at American Bell, Inc.; William W. Seelinger, secretary, who is Manager of Videotex Market Development for IBM; and Larry C. Blasko, treasurer, who is director of information technology and deputy director of domestic communications for the Associated Press.

VIA is located at Suite 200, 2000 L St., N.W., Washington, D.C. 20036.

Graphics Board Fits VT100

Tektronix, Inc. 4014 software compatibility and Selanar's native mode with a microprocessor-based vector generator to aid programming. Both the VT100 and Selanar Graphics memories can be displayed either simultaneously or individually for data on graphics applications.

Plot modes consist of normal, point and incremental plot, while vector variation modes include solid lines, dotted, dot-dashed, short dash and long dash line, the vendor said. Other features include transparent CPU to RS-232 printer port, 480-by-800 resolution, Tektronix, Inc. 4010 and 4014 emulation and field-installable tube and plug-in graphics circuit card.

The retrofit board, the SG480, is priced at \$1,395. Selanar is located at 4212 N. Freeway Blvd., Sacramento, Calif. 95834.

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Data Analyzer Menu-Driven

MONTGOMERYVILLE, Pa. — Digilog Network Control Division has announced a data communications analyzer with full keyboard programmability said to give top-of-the-line capabilities for about half the price of current models.

The Data Line Monitor (DLM) V reportedly offers a menu-driven programming method and language; electrically erasable read-only memory for running repeatable interactive tests; diagnostic, edit and update capabilities; X.25 frame and packet; and the DLM IV dual diskette subsystem, an optional mass storage unit.

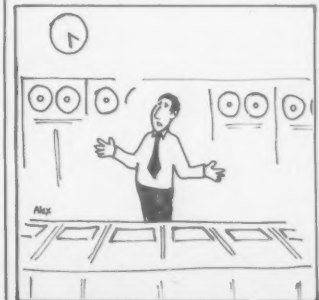
The analyzer costs \$5,395, Digilog Network Control Division said, from 1370 Welsh Road, Montgomeryville, Pa. 18936.

Modem Runs At 1,200 Bit/Sec

CHICAGO — A 300- or 1,200 bit/sec autodial modem has been announced by U.S. Robotics, Inc.

The Auto Dial 212A, said to use only one-sixth the circuitry of comparable modems, operates at full- or half-duplex and contains an audible phone line signal monitoring system. The modem is Bell Laboratories 103-, 113- and 212A-compatible and features a self-test system.

The unit costs under \$600 and carries a limited two-year warranty. The vendor is located at 1123 W. Washington Blvd., Chicago, Ill. 60607.



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You'll see some very dramatic introductions in the area of personal computer software. In applications software for manufacturing and financial management. In decision support systems. In fact, there's little that isn't included under their broad net.

Cullinet. In many ways it's the same company. In many more ways, it's a better one.

So you can look at this as Cullinane's last ad. Or as Cullinet's first one.

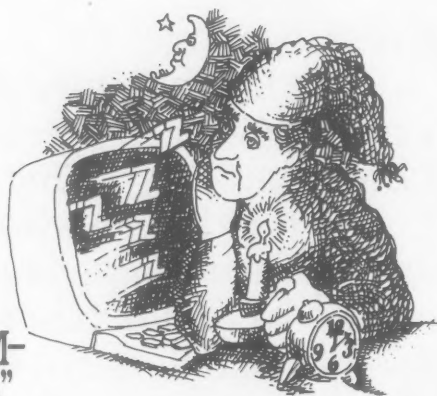
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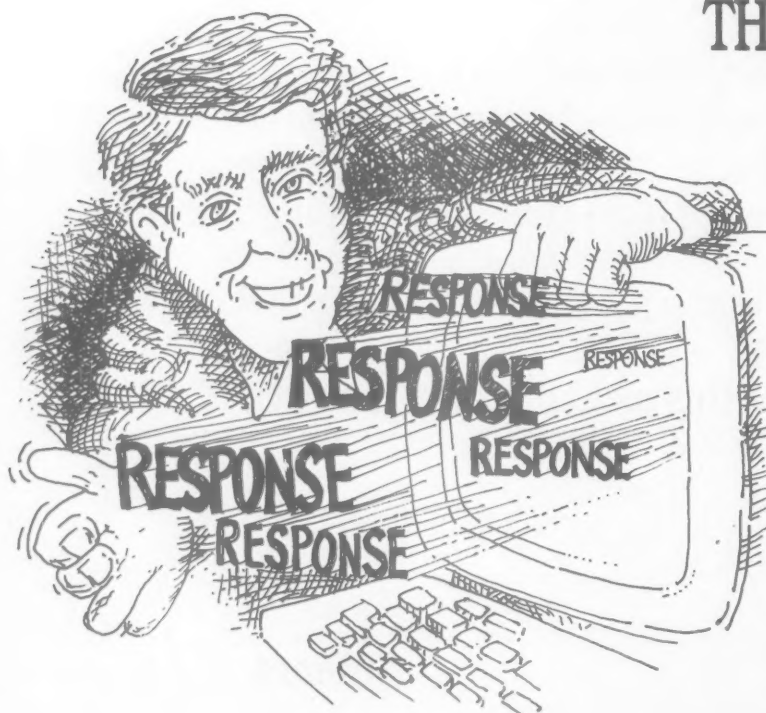
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Storage Technology

No Need for In-House Programmer Business System Handles Accounting

By Susan Blakeney
CW Staff

PORTSMOUTH, N.H. — A small business system that reportedly enables small businesses to automate their accounting and forms-oriented business procedures without the need of an in-house programmer has been unveiled here by Unidata Systems, Inc.

The Unidata 3000 is a Zilog, Inc. Z80-based integrated hardware and software system and features a vendor-developed application generator that allows users without computer expertise to create customized application programs based on routine business forms.

According to the vendor, the application generator has "embedded knowledge" that automatically performs most of the steps involved in programming, permitting the user to develop entire application programs on a prompted basis. Users are provided with built-in coaching functions, which allow them to produce forms in a fill-in-the-blank manner. After the



Unidata 3000

user enters the information, the Unidata 3000 reportedly updates files automatically, sorts and collates information and generates or archives the documents.

In addition, the Unified software incorporates a data base manager, virtual memory management and dynamic key allocation. It operates under Unidata's proprietary operating system software and also features optional Digital Research, Inc. CP/M compatibility and menu-driven word processing capabilities, the vendor said.

The relational-like and hierarchical data base management system (DBMS) automatically organizes and maintains information in such a way that data from one form (program) can be recalled for use by any other because it works with variable length strings. Data is organized in the data base in a manual office forms filing system manner, which is automatically indexed and sorted as lists within lists, the vendor explained.

Linked to the DBMS is an interactive compiler and interpreter that acts as a data translator and coach, notifying the user of any programming mistakes. This function leads first users through methods for filling in blanks while the operating system coordinates work between the user and the system, Unidata said.

The vendor's Unisyn English-like language has a vocabulary of 70 words and minimal punctuation that is said to "understand" words alone and in context. It is a business-oriented language that boasts data base management access commands plus a set of arithmetic, logical, conditional and relational operations, according to

(Continued on Page 84)

ATS Micro Family 8086-Based, Boasts Trilevel Architecture

TORRANCE, Calif. — Cado Systems Corp. has announced the Tiger ATS family of Intel Corp. 8086-2-based microcomputers that employs a trilevel architecture allowing the systems to support simultaneously a large number of terminals without response degradation.

The ATS family consists of two members: the ATS 32, which offers 32 ports; and the ATS 64, which supplies 64 ports. Each system employs three different types of microprocessors: transaction processors, intranet processors and control biprocessors. Each microprocessor has dedicated random-access memory (RAM) and can share a global memory ranging from 256K- to 1M byte, the vendor said.

The Transaction processor handles short-duration transactions for up to eight terminal devices communicating at up to 19,200 bit/sec each, the vendor said.

The intranet processor is also said to incorporate the 8086-2 and serves as the system resource manager. The intranet processor is equipped with 32K bytes of private RAM and up to 16K bytes of dedicated programmable read-only memory.

The control biprocessor consists of an Intel 8089 dual-channel processor to interface with storage devices. The processor has an 8K-byte I/O buffer.

Capable of supporting up to 1.1G bytes

of Winchester disk storage, the system costs between \$30,000 and \$250,000, depending upon configuration, the vendor said from 2771 Toledo St., Torrance, Calif. 90503.

Executes 1 Mips

Logic System Based on 68000

SUNRISE, Fla. — Logic Computer Corp. has unveiled the Logic Computer System, based on an 8-MHz version of Motorola, Inc.'s 68000, which executes approximately 1 million instructions per second (Mips).

The system has a 16-bit data path but internally features 32-bit registers and supports 32-bit operations, according to the vendor. The system can reportedly handle communications rates of serial I/O at 34.5 to 19,200 bit/sec, parallel up to 1M byte/sec. It offers a choice of storage media and a number of software packages for single- and multiuser processing. The software consists of the vendor's multiuser control system, Bell Laboratories' Unix System 3, a Cobol-based operating system and a Digital Research, Inc. CP/M Emulator.

Pricing on the Logic Computer System starts at \$7,720. Further details are avail-

able from the vendor at Suite 304, 7800 W. Oakland Park Blvd., Sunrise, Fla. 33322.

Low-Profile Micro Based on 68000

RENO, Nev. — Sage Computer Technology, Inc. has announced the Sage II, a low-profile version of its microcomputer based on a 16-bit Motorola, Inc. 68000 microprocessor.

The Sage II incorporates a half-height floppy disk drive that reportedly reduces the size of the unit by about 50%. The Sage II comes with 128K bytes of main memory, which can be expanded to 512K bytes.

Systems cost from \$3,600, the vendor said from Suite 4, 35 N. Edison Way, Reno, Nev. 89502.

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Multiuser Hard Disk Fits DEC, Apple, IBM Micros

NORTHBROOK, Ill. — Prizm Computer Products, Inc. has introduced a 10M-byte multiuser hard disk with a 20M-byte streaming tape backup system for use with the IBM Personal Computer, the Digital Equipment Corp. Rainbow series and Apple Computer, Inc.'s Apple II, II+ and III micros.

Prizm's hard disk unit is reportedly expandable to up to 80M bytes of formatted capacity and is capable of transferring at rates of 5M byte/min., according to the vendor. The disk was designed to connect with multiple computers for data file sharing so that several office applications can be per-

formed simultaneously, the vendor explained.

The disk costs \$4,195 for the 10M-byte system and \$4,695 for the 20M-byte version. Prizm is based at 702 Landwehr Road, Northbrook, Ill. 60062.

Line Printer Announced

SKOKIE, Ill. — Teletype Corp. has unveiled a heavy-duty line printer that operates asynchronously at speeds up to 9,600 bit/sec at a maximum rate of 300 line/min.

The T300 features a 2,000-char. line buffer that reportedly compensates for any speed differential and allows

For Syfa Network System

Distributed Processing Nodes Out

IRVINE, Calif. — Computer Automation, Inc. has announced low-cost distributed processing nodes for use in small or remote locations where work loads are not sufficient to justify larger configurations of its Syfa

Network Processing System.

System Packages 1 and 2 are reportedly based on the vendor's Syfa 200 and 300 Network Processors. Package 1 includes an 8M-byte Winchester 8-in. hard disk drive and a 1M-byte floppy diskette drive. Package 2 has a 32M-byte Winchester 8-in. hard disk with a 1M-byte floppy diskette drive. Each package also includes:

- Power supply and chassis — either five-slot with Package 1 or nine-slot with Package 2, plus desk enclosure and console.

- A 64K-byte MOS memory plus disk controller.

- Four-port standard multiplexer with RS-232C compatibility for display stations, microcomputers, bar code readers and various data collection devices.

- Two Syfa Information Stations with cables.

- A 200 char./sec printer with controller and cable.

Package 1 costs \$20,010 and Package 2 is priced at \$23,150, a spokesman for Computer Automation said from 2181 Dupont Drive, Irvine, Calif. 92713.

Management System Unveiled

MANCHESTER, N.H. — Summa Four, Inc. has introduced a communications management hardware system designed for small businesses and branch offices of

larger businesses.

The system is targeted for installations with less than 16 central office trunks. It operates on all types of telephone systems and is aimed

at businesses with either the IA2-type key systems or small electromechanical private branch exchanges, the vendor said.

A user authorization code provides accurate records kept by users within the system. Other standard features include account code billing, speed calling and six system-wide management reports.

The base system with printer is available for between \$5,000 and \$6,000 in an eight-trunk configuration. More information is available from Summa Four, 2456 Brown Ave., Manchester, N.H. 03103.

Bruning Cuts Easydra² Fee

ITASCA, Ill. — Bruning has announced a 23% drop in price for its Easydra² computer-aided drafting system. It has also redesigned the system by adding Motorola, Inc.'s 68000 16-bit chip to its architecture.

The new price for a complete turnkey system is \$57,700, including Easydra² program, Hewlett-Packard 9836 computer, two 5 1/4-in. flexible disk drives, HP 7580 D-size plotter, custom-designed desk and chair, installation and training.

The new program is said to emphasize speed, flexibility of drafting standards and a set of editing commands. A broad range of user requirements can be accommodated with Bruning's array of 18 hardware options, the vendor claimed. Also, computer-aided manufacturing applications can be accommodated with the use of a software interface.

More information is available from Bruning at 1800 Bruning Drive W., Itasca, Ill. 60143.

Ibis Illustration System Introduced for Artists

SEATTLE — Morgan-Fairfield Graphics has announced the Ibis Illustration System, based on the Beacon color graphics processor developed by Florida Computer Graphics Corp.

Designed for use by artists, illustrators and graphics designers, the system, which is based on a Zilog, Inc. Z80-A microprocessor, features

access to 32 pen weights, user-definable colors, 256 colors and digital templates.

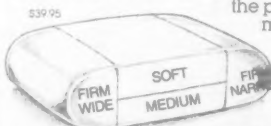
The turnkey system comes with a 5M-byte Winchester disk drive, a 640K-byte floppy disk drive, keyboard, digitizing tablet and electronic pen. The system costs \$39,500, the vendor said through P.O. Box 5457, Seattle, Wash. 98105.

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Boast Large Capacities Storage Subsystems Debut

COSTA MESA, Calif. — A line of mass storage subsystems boasting large capacities, data integrity and improved equipment reliability has been announced here by California Computer Group, Inc.

The Masstore subsystems consist of modular disk drives backed up by the user's selection of start/stop, streaming or cartridge-type magnetic tape drives. All subsystems are reportedly hardware- and software-compatible with the following minicomputers: Digital Equipment Corp.'s VAX-11, LSI-11 and PDP-11 machines; Data General Corp.'s Nova and Eclipse; Point-4 Corp.'s minicomputers; Texas Instruments, Inc.'s 990 and 600 series; and all 16- and 32-bit Perkin-Elmer Corp. machines.

The Masstore line is comprised of three products. The Masstore-1X was designed for applications with very large data bases. It can be equipped with one to four Fujitsu Ltd. Eagle Winchester disk drives to provide fast data access. Each drive has a maximum unformatted capacity of 474M bytes. Maximum formatted storage in the largest capacity configuration is 1,395M bytes, the vendor said. Pricing starts at \$21,500.

The Masstore-2X was designed for office environments and features a top-loading, streaming magnetic tape drive. Prices for this line start at \$27,850.

Rugged VAX Announced

ORINDA, Calif. — Rugged Digital Systems, Inc. has announced specialized versions of Digital Equipment Corp. VAX-11 processors and accompanying disk subsystems, designed to operate in severe environmental conditions.

Designed for subsystems for military and industrial users of VAX-11 processors, the units are equipped with a protected chassis designed to offer insulation from shock, vibration, severe temperatures, humidity and dust, the vendor said.

The firm is offering two processors, the R/730 and R/750. The units employ the same basic electronics as DEC's VAX-11/730 and VAX-11/750. Both processors support DEC's VMS operating system as well as all VAX-11 applications, the vendor said.

The R/730 supports up to 5M bytes of main memory and includes a floating-point accelerator. The R/750 can support up to 8M bytes of main memory, a floating-point accelerator and a 4K-byte cache, the vendor said.

In addition, the firm has announced specialized versions of DEC disk subsystems designed to accompany the two systems. The R/RUA80 subsystem employs DEC's 14-in. Winchester disk drive and controller and supports up to 121M bytes of formatted storage with an average seek time of 25M byte/sec and a burst data rate of 1.2M bit/sec, the vendor said. The R/RU81 supports up to 456M bytes of formatted storage with an average seek time of 28M byte/sec. Systems cost from approximately \$185,000, the vendor said from 45 Evergreen Drive, Orinda, Calif. 94563.

Masstore-3X is a tabletop/rack mount subsystem suited for small business applications, according to the vendor. This series is base priced at \$13,000.

In a concurrent announcement, the vendor unveiled the Ultravox controller, a family of optimized minicomputer systems based on DEC's VAX-11 computers. This product line reportedly substitutes firmware-driven controllers on each bus to achieve maximum integration of peripherals, according to the vendor. Pricing begins at \$43,950.

California Computer Group is headquartered at Suite G-10, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

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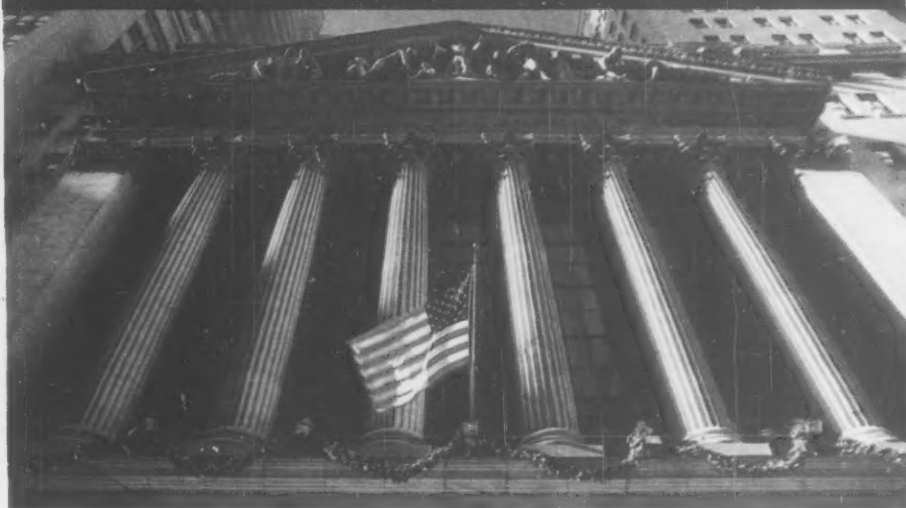
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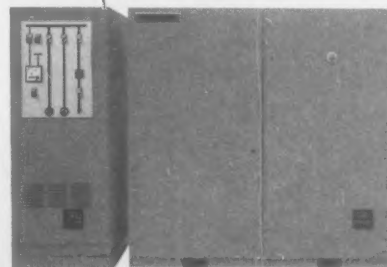
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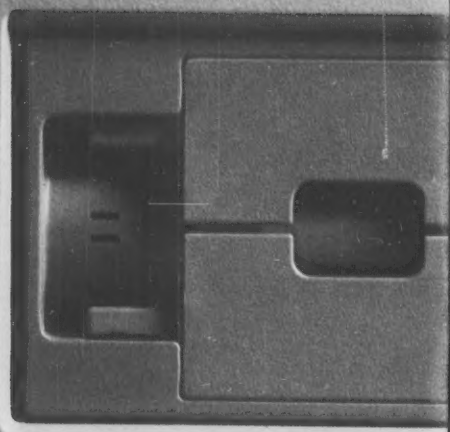


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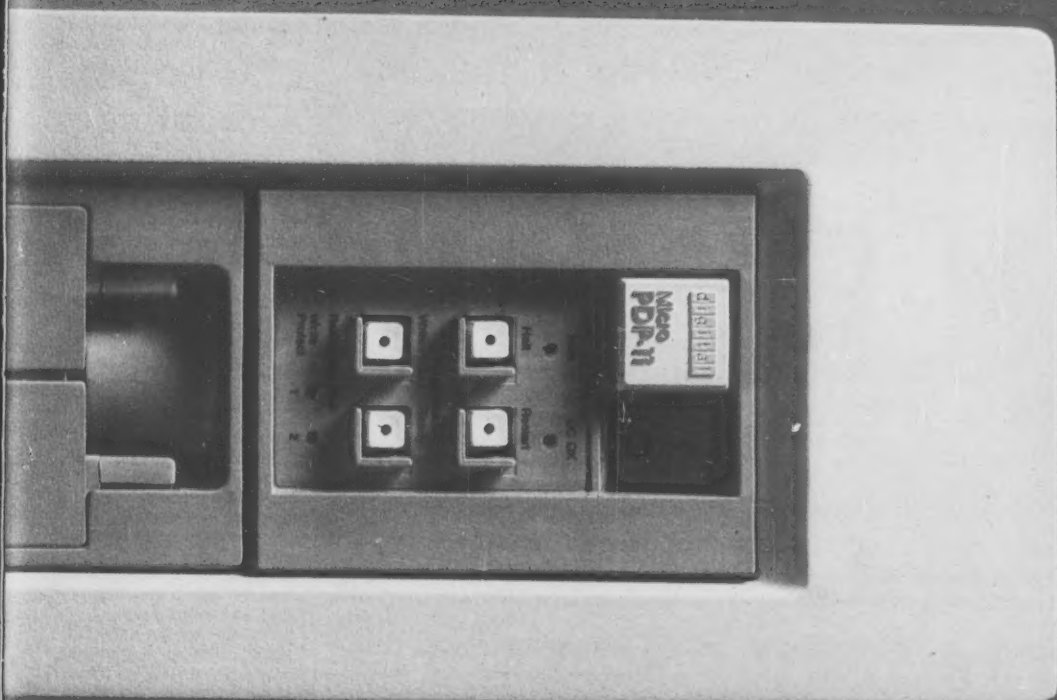
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Law Office Management, Info System Debuts

EUGENE, Ore. — A law office management and information system has been unveiled here by Western Computer Systems, Inc. that reportedly features multiple work stations, word processing, forms generation, billing, management reporting, financial accounting and interfaces for legal software services.

The Professional Office Management & Information

System offers word and data processing configured in either a shared-logic or multiuser network environment, according to a vendor

spokesman.

The basic systems price starts at \$9,960 and include 2 workstations, a printer and 10M bytes of hard disk Win-

chester memory and backup.

This system can be upgraded to 24 workstations, multiple printers and 300M bytes of hard disk, the spokesman

noted.

Western Computer Systems is headquartered at 1000 Bertelsen Road, Unit 1, Eugene, Ore. 97402.

Nine-Function Card IBM-Micro-Compatible

SHERMAN OAKS, Calif. — Advanced Data Technology has announced a nine-function card that is reportedly compatible with the

IBM Personal Computer.

Packaged in one of the Personal Computer expansion slots, the Series 1000 card includes seven hard-

ware and two software features, according to the vendor. These features include 64K- to 256K-byte socketed dynamic memory with pari-

ty, serial I/O port, parallel I/O port, clock calendar with battery backup, game port, a controller, interface, print spooler and a random-access memory disk. Software is included for board diagnostics and setting of the IBM internal clock calendar.

The Series 1000 multi-function card is priced at \$595 with 64K-byte memory, the vendor said from 13600 Ventura Blvd., Sherman Oaks, Calif. 91423.

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CPU Targets Accounting

(Continued from Page 79)
the vendor.

The runtime environment reportedly controls the operation of Unidata 3000's hardware. It automatically attends to keyboard data entry, validation and editing, visual display management and formatting of report data.

Unidata 3000's hardware includes a desk-top keyboard and CRT, a unit containing the computer and memory and a choice of either a letter-quality or a draft-quality printer. Besides the Z80 chip, the computer module contains a real-time clock, 128K bytes of resident memory, two on-line floppy disk drives with a combined capacity of 2.5M bytes and two communications ports.

The system is available for \$10,000 without a printer. Unidata can be reached through P.O. Box 701, Portsmouth, N.H. 03801.

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Sturdy PDP-11-Based System Out

OAKLAND, Calif. — Trilobyte Computer Corp. has announced a ruggedized version of Digital Equipment Corp. PDP-11/LSI-11 Winchester-based computer systems for field use.

Trilobyte II reportedly provides cooling and protection from dust, shock and vibration, making it possible to use commercial Unibus/Q-bus processors, memories

and disks in adverse environments.

Pricing for the Trilobyte II

Disk Subsystem Released

LA GRANGE PARK, Ill. — BC Systems, Inc. has announced a high-capacity removable disk subsystem that combines Winchester disk reliability with floppy disk removability for the IBM Personal Computer, Victor Business Products, Inc. Vic-

tor 9000 microcomputer and S-100-based systems.

The Frigid Disk Subsystem boasts 20M bytes of memory.

Pricing starts at \$6,750, the vendor said from 1016 E. 31st St., La Grange Park, Ill. 60525.

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Printers Out For Micros

EL SEGUNDO, Calif. — Xerox Corp. has announced two 40 char./sec bidirectional daisywheel printers for microcomputers, word processors and small business systems.

Called the Xerox 1730-320 and 1730-340, the units feature serial and parallel interfaces and operate with either plastic or metal daisywheel print elements, according to the vendor.

The 1730-320 reportedly costs \$2,395 and the 1730-340 costs \$2,995.

A dual-tray cut sheet feeder costs \$1,995, the vendor said from 800 Apollo St., El Segundo, Calif. 90245.

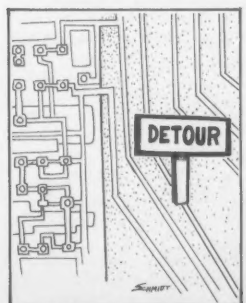
Ramplus Fits IBM Micro

SAN DIEGO — Raytronics, Inc. has announced a memory board that adds 1M byte of memory to the IBM Personal Computer.

Called Ramplus, the unit's memory banks are designed to accept either 64K- or 256K random-access memory chips. The vendor noted that users electing to use 64K chips can replace them with 256K chips when they become available.

The board contains a parity error detection logic capability that can be abled or disabled with a dip switch. Other functions include serial port, parallel port and clock/calendar with battery backup.

Memory boards cost from \$575, the vendor said from 4901 Morena Blvd., Building 900, San Diego, Calif. 92117.



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For Televideo's 925, 950

Add-In Graphics Board Out

SACRAMENTO, Calif. — Selenar Graphics Corp. has announced the SG-900, an add-in graphics board for Televideo Systems, Inc.'s 925 and 950 terminals.

The SG-900 board is reportedly

field-installable and uses a standard Televideo communications interface. Features of the SG-900 include emulation of Tektronix, Inc. 4010 and 4014 graphics terminals, including a 660-by-250 dot resolution on an 8-in. by 5-in. screen, a 4,096-by-4,096 pixel addressable plot area, vector variation, full-page break, point plot and incremental plots, reported a spokesman for the vendor.

The SG-900 costs \$1,095, the spokesman said. Selenar Graphics is located at 4212 N. Freeway Blvd., Sacramento, Calif. 95834.

Printer Boasts 1,000 Line/Min

MALDEN, Mass. — A high-speed band printer that operates at speeds up to 1,000 line/min. with a 64-char. band has been unveiled here by Data Printer Corp.

The Model 3101 is equipped with acoustically buffered cabinetry, caster, spool-to-spool ribbon, rear control panel and extensive diagnostics, according to the vendor. Optional features include forms length selector switch, formal load, paper puller, elapsed time meter and a digital line counter.

The printer is available at under \$11,000. Further details are available from Data Printer, headquartered at 99 Middlesex St., Malden, Mass. 02148.

Interface Board Features Z80A

SANTEE, Calif. — A floppy disk interface board has been introduced by Greco Systems, Inc.

The Z2800 is said to feature a Zilog, Inc. Z80A processor with 2K bytes of random-access memory (RAM) and 4K bytes of read-only memory (ROM), a floppy disk port and an RS-232C port. It is supplied with firmware to duplicate the Digital Equipment Corp. TU-58 cassette drive protocol and a jumper-selectable executive program so users can develop their own custom interface, the vendor reported.

The Z2800's memory is expandable up to 40K bytes of RAM/ROM and a second RS-232C port is also available. The basic unit costs \$195 from Greco Systems at Suite A15, 10020 Prospect Ave., Santee, Calif. 92071.

Recount 4 Out For Accounting

MOORESTOWN, N.J. — The latest version of Danyl Corp.'s expense management system for copiers, data terminals, facsimile machines and other office equipment has been unveiled.

Recount 4 reportedly allows in-house data processing and provides account validation with alphanumeric entry capability. The system records data on a diskette that contains valid account tables. Users can choose between 5¼-in. or 8-in. diskettes that are compatible with a range of systems, a spokesman for the vendor explained.

The basic Recount 4 system, which includes a single terminal, is priced at \$6,000. Further details are available from Danyl at 1509 Glen Ave., Moorestown, N.J. 08057.

Sola Introduces Volt Regulators

ELK GROVE VILLAGE, Ill. — Two models of a line voltage regulator from Sola Electric, Inc. will accommodate higher voltage loads, reportedly eliminating the need for wiring smaller units together in parallel at installation sites where a higher regulated power is required.

The units are available in 10-kVA and 15-kVA sizes in two series. Transformers in the Constant Voltage Transformer Series are recommended for ac applications in which harmonics can affect operation. The 10-kVA version costs \$3,926 and the 15-kVA unit costs \$4,828, a vendor spokesman reported.

For ac applications in which noise attenuation is required, the Micro/Minicomputer Regulator Series is said to protect precision electronic equipment from all line power irregularities except total line failure, the spokesman said. The 10-kVA version costs \$4,114 and the 15-kVA unit costs \$5,060.

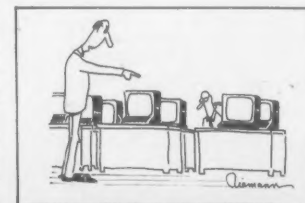
More information on the products is available from Sola Electric, located at 1717 Busse Road, Elk Grove Village, Ill. 60007.

Micro Users Get Sweet-P Plotter For Graphics

SAN DIEGO — A graphics plotter for microcomputers, including software and interface hardware, has been unveiled by Enter Computer, Inc.

The Sweet-P Personal Plotter provides users with colorful pie charts, graphs, illustrations and various other business graphics, according to the vendor.

This product is priced at \$795. More information is available from Enter Computer, located at 6867 Nancy Ridge Drive, San Diego, Calif. 92121.



Univac Puts Off Delivery Of 1190 Series to March '84

BLUE BELL, Pa. — Sperry Univac has announced that deliveries of its 1190 series of mainframe systems has been pushed back to March 1984, nine months later than the June 1983 expected date.

Shipments of the large systems will reportedly be stepped up through the second and third quarters of 1984, with volume shipments beginning in August of next year.

The vendor is blaming the ship-

ment delays partially on the "1190 not meeting the standards set by the company" and also on a strong early customer response to the system's introduction, a spokesman said.

"The strong early response to the Sperry 1190 system has exceeded expectations. We expect continued market acceptance with no impact upon our order backlog as a result of the schedule change," according to a Sperry spokesman.

Board-Level Processor Out

EMERYVILLE, Calif. — SBE, Inc. has announced the Modulas Ten M68k10, a board-level processor that is compatible with Intel Corp.'s Multibus and IEEE-P796 standards.

The circuit board is equipped with a Motorola, Inc. 68000 microprocessor, 256K bytes of random-access memory, support for Intel's multi-module and multiprotocol serial communications and parallel control, according to a spokesman for the vendor.

The unit costs \$1,995, the vendor

said from 4700 San Pablo Ave., Emeryville, Calif. 94608.

Peac System Gets Graphics

SOUTHBOROUGH, Mass. — Decision Graphics, Inc. has announced a graphics work station for the firm's Peac computer-aided design/drafting system.

Called the Peac 4100, the unit provides the same basic capabilities as the firm's 7200 workstation, but is less expensive and reportedly more flexible.

Software includes general two-dimensional graphics, schematic planning, digitized existing drawings, inventory bill of materials, the Peac data base, symbol libraries and general plotting, a spokesman for the vendor said.

The Peac 4100 workstation costs from \$6,400. Software modules cost from \$3,000, the vendor said from 11 Main St., P.O. Box 306, Southborough, Mass. 01772.

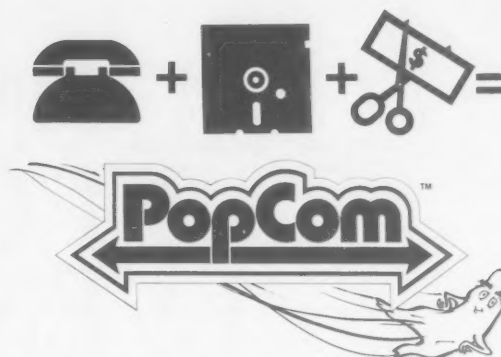
Format Aid Out For Typereader

MANCHESTER, N.H. — Hendrix Technologies, Inc. has enhanced its Typereader page reader with an interface that provides it with more formatting capabilities.

Compatible with Wang Laboratories, Inc.'s VS series of computers, the Deluxe Interface reportedly improves formatting of columnar and indented text and data, which are read by the Typereader for automatic input to the Wang VS. There will be no extra charge and no special hardware needed for this feature, the vendor added.

The revised product costs \$9,995 until April 30, after which it will cost \$14,995.

The vendor is located at 670 N. Commercial St., Manchester, N.H. 03101.



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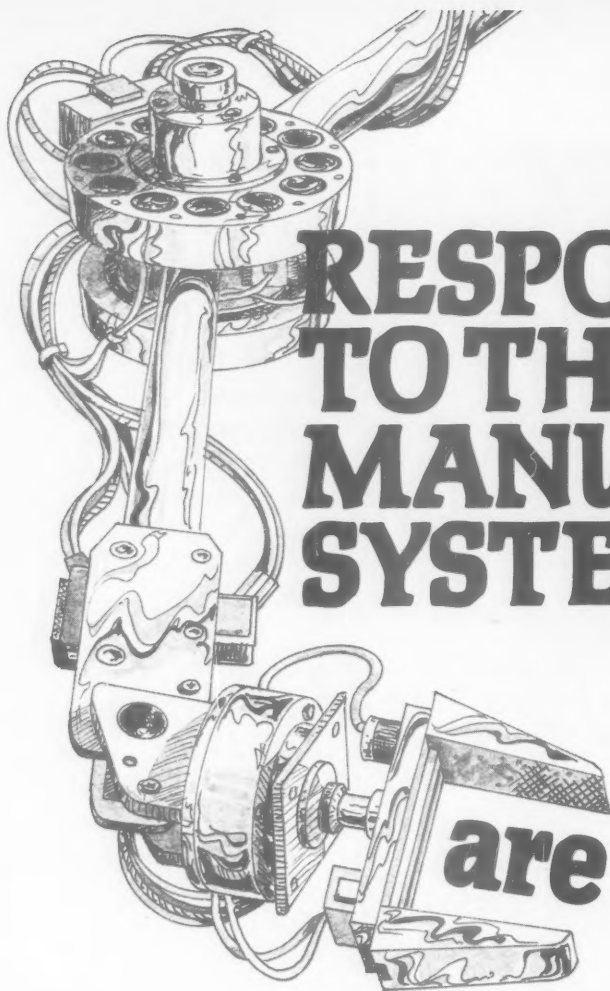
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Fits Nova, Eclipse, MV Series

Board Connects DG Minis to Ethernet

WESTFORD, Mass. — Interlan, Inc. has introduced a controller board said to be the first to connect Data General Corp. minicomputers to the Xerox Corp. Ethernet local-area network.

The NI4010A Data General Ethernet/IEEE-802 CSMA/CD (carrier-sense multiple access with collision detection) Communications Controller is said to be an intelligent controller board that contains the data communications logic required for interfacing DG's Nova, Eclipse and 32-bit Eclipse/MV minicomputers to Ethernet.

The controller also complies with the new IEEE-802.3 standard and European Computer Manufacturers Association 80/81/82 technical specifications for 10M bit/sec CSMA/CD local-area networks, a vendor spokesman claimed. When attached to the Interlan NT10 transceiver unit, the NI4010A controller performs the specified CSMA/CD local network data link and physical channel functions that support communications by stations at 10M bit/sec over distances up to 2,500 meters on a shared coaxial

cable, the spokesman added.

On transmission, the NI4010A formats frames and performs the CSMA/CD transmit link management functions

of collision detection, back-off timing and retransmission as required to successfully deliver frames onto the network. When not transmitting, the NI4010A

continuously listens to the network for frame traffic intended for it. Only frames with a matching address are accepted by the controller for subsequent transfer to the DG host system, a spokesman claimed.

Address Recognition

The controller performs physical, multicast group and broadcast address recognition. It can reportedly store up to 13.5K bytes of received frames.

By minimizing the possibility of dropping incoming frames, a DG system with the NI4010A can engage in high-bandwidth virtual-circuit communications with other stations on the network. For transmit buffering, the NI4010A has a 1.5K-byte transmit buffer from which all frame retransmissions are made when transmit collisions occur.

All data block transfers between the NI4010A and system memory are under the control of an on-board data channel controller. This data transfer technique is said to provide high data transfer rates between the host DG minicomputer and other stations on the local network.

The controller will be available in April for \$2,490 from Interlan, 3 Lyberty Way, Westford, Mass. 01886.

File Aid, Clusters Debut From Syntrex

NEW YORK — Syntrex, Inc. has unveiled a series of clustered word processors and electronic file software.

The Center Series Clusters is composed of multiple clustered word processing systems and designed for high-volume word processing centers.

It features the 16-bit Intel Corp. 8086-based Aquarius Plus workstation and 384K bytes of internal memory and a text editor that reportedly makes input and revisions of large, complex formatted documents simple.

It also features automatic paragraph and line numbering, automatic index genera-

tion, automatic table of contents and automatic footnote numbering and alignment. Other features include pagination with multiple headers and footers with window and orphan control, background printing with print queueing and a queue manager, multiple window editors, simultaneous edit, print pagination and filing options.

A spokesman said footnote references are automatically moved with their reference, page endings realigned, outlines created and pages printed automatically and simultaneously.

(Continued on Page 93)

WP Saturn Update Fits VAX, PDP-11s

MINNEAPOLIS — Saturn Systems has introduced Version 4.2 of WP Saturn, a word and

list processing package for the Digital Equipment Corp. PDP-11 and VAX computers operat-

ing under DEC's RT-11, TSX-Plus, RSX, RSTS or VMS.

Features of the package include a range of editing and formatting commands and full documentation, a spokesman said. DEC VT100 screen-scrolling capability has been built into the system so that the window can be moved up or down with the cursor keys.

The list processing package has been improved to provide quicker access to files and easier definition of search and replace values. The sort and select program now allows for the specification of a range of values when creating output files.

The word and list packages can be purchased separately or together. Prices start at \$489. Saturn Systems can be reached at 6875 Washington Ave., Minneapolis, Minn. 55435.

Data Base, Graphics Packages Announced for Wang Micro

LOWELL, Mass. — Wang Laboratories, Inc. has introduced two software packages for its Professional Computer microcomputer — a data base package and a business graphics package.

The Professional Computer Data Base is said to allow the user to create, sort, query and gather information prior to output. The data reportedly can then be merged into either Wang's Multiplan spreadsheet or a word processing document. This package will be available

in the spring for \$650.

Wang's Professional Computer Business Graphics software is said to allow the user to utilize statistical information in business graph form. It allows the user to create bar, line and pie charts and produce hard-copy output on a variety of peripherals, a vendor spokesman said. The graphics package will also be available in the spring and is priced at \$300.

Wang Laboratories is located at One Industrial Ave., Lowell, Mass. 01851.

All-In-One Guaranteed

MAYNARD, Mass. — Digital Equipment Corp. has announced a money-back guarantee on its VAX-based All-In-One office automation computer systems.

The Satisfaction Guaranteed program allows a customer to return any All-In-One system within 120 days after delivery for a full refund of hardware purchase price and software license fee, the vendor explained.

Further details may be obtained from DEC headquarters, Maynard, Mass. 01754.

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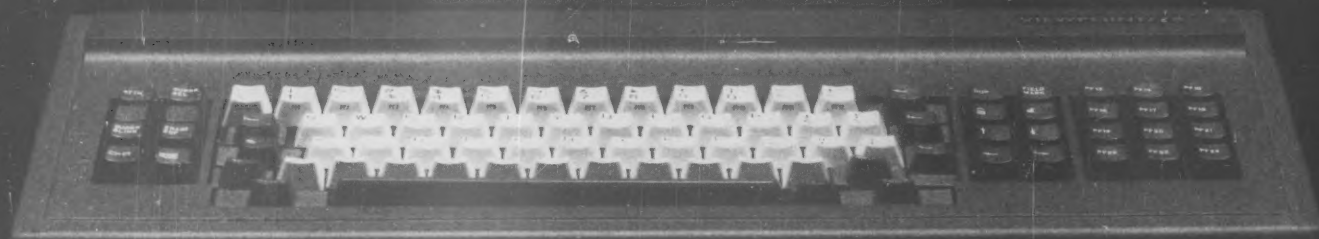
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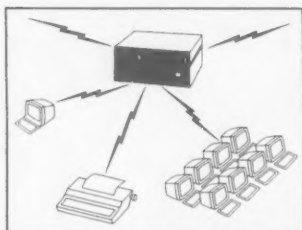
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Freeform DBMS Debuts

GRAND PRAIRIE, Texas — Dimension Software Systems, Inc. has unveiled Personal Computer/Data Base Management, said to be a complete shared-network and relational data base management system for IBM Personal Computers and Digital

Equipment Corp. Rainbow 100 personal computers and VAX-11 superminicomputers.

Freeform, the operating system software, was designed to bring mainframe capabilities to smaller computers on a shared, high-performance data base machine. It will provide over 60 users with features such as screen formatting and report and application program generation. Also, users reportedly can perform complex operations and create custom applications without programmer assistance, according to a spokesman for the vendor.

Planned future additions to Freeform include an electronic mail function, a Basic language interface, a runtime-accessible library of application programs, local-area networking and shared peripherals, the spokesman added.

The price for the entire package ranges from \$700 to \$950 per personal computer. Prices vary depending upon configuration, the spokesman said. Further information can be obtained from Dimension Software Systems, located at 605 E. Safari Drive, Grand Prairie, Texas 75050.

Entry System Scans Optically

BRECKSVILLE, Ohio — Ecco Information Systems has introduced an automatic document-entry system said to read optically typewritten documents into NBI, Inc. word processing equipment.

The Dest Workless Station optical character reader can enter a page of information into a word processor in 25 seconds with one mistake per 300,000 characters, a vendor spokesman said. It can copy up to 140 pages per hour. The operator loads the pages into a tray and the characters are entered and scanned unattended, the spokesman added.

The optical reader is available for between \$10,000 and \$15,000 from Ecco Information Systems, a division of Electronic Engineering Co., 6896 West Snowville, Brecksville, Ohio 44141.

'WP/1' Version Out for Series/1

SAN JOSE, Calif. — Systar Corp. has introduced an enhancement of its office automation software for the IBM Series/1 running under IBM's EDX operating system.

Version 4 of WP/1 is said to feature a text editor, an on-line Help facility, a spelling checker, enhanced text-formatting capabilities and support for additional correspondence-quality printers. The editing facility now supports block-mode IBM 4978 and 3101 terminals.

The enhanced version of the software is available for a one-time license fee of \$2,500. Further details can be obtained from Systar, located at Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

Docman Runs On Decsystem

BURLINGTON, Vt. — A relational document management system for users of Digital Equipment Corp. Decsystem-20s running under DEC's Tops-20 has been introduced by Results, Inc.

Docman is said to feature flexible data structures and to accommodate hierarchical, network, circular or custom-designed structures. Documents reportedly can be displayed, edited, deleted, merged, copied, renamed, printed, encrypted and transferred to a different document base, a vendor spokesman said.

A single-system license costs \$1,750. More information is available from Results, located at 217 S. Union St., Burlington, Vt. 05401.

Word Processors, File Aid Bow

(Continued from Page 91)

The Center Series is said to ensure correct document formatting, regardless of changes.

A typical small cluster with two workstations sharing a printer is priced at \$19,000. Each station can operate independently while sharing access to the attached printer. Individual documents can be queued as created and priority jobs can interrupt lesser tasks.

A typical medium-size cluster with four workstations sharing a 10M-byte disk and two printers costs \$40,000. With it document segments can be input or edited by several operators, then joined with a single command to form a final document.

A typical large system featuring nine workstations, 30M bytes of redundant storage, the Electronic File Room software package, application and list processing is priced at approximately \$100,000. With this system, manual procedures typically required to track documents in the center are eliminated.

The Electronic File Room can reportedly find anything in an organization's electronic file, typically in less than 30 seconds, even if its location is unknown.

The package automatically builds an index to every document in the electronic file by every word used in each document.

The package searches across any level of the electronic file hierarchy (folders, drawers, cabinets and so on) and even across several rooms linked together by a local-area network. It also provides for searches based on criteria not contained in the text of the document, such as author, typist, date, subject, abstract or category.

The package costs \$3,900 from Syntrex at 246 Industrial Way W., Easton, N.J. 07724.



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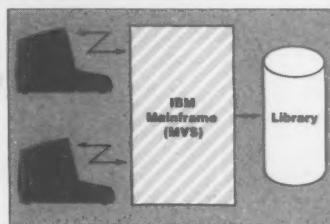
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Wang word processors can now communicate with their IBM mainframe, without losing a word.



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Soft-Switch is a distributed software product developed by Integrated Technologies, Inc. to expand the capabilities of document routing and archiving. With Soft-Switch, Wang OIS, VS and WPS word processors can now archive documents on the mainframe—totally intact, down to the number of key strokes—and index them as you like (e.g. keyword, author, date). These documents can then be transmitted to other Wang stations, or even IBM or NBI stations, using ITI's extensive

edit level translation capabilities. This is done using Soft-Switch's store-and-forward mode—utilizing an IBM (or compatible) mainframe with the MVS operating system. This means that no communication is necessary between the WP operators—the recipient receives the document directly from the mainframe. And only one routing instruction is necessary, regardless of the number of destinations—within one office, across the country, or around the world.

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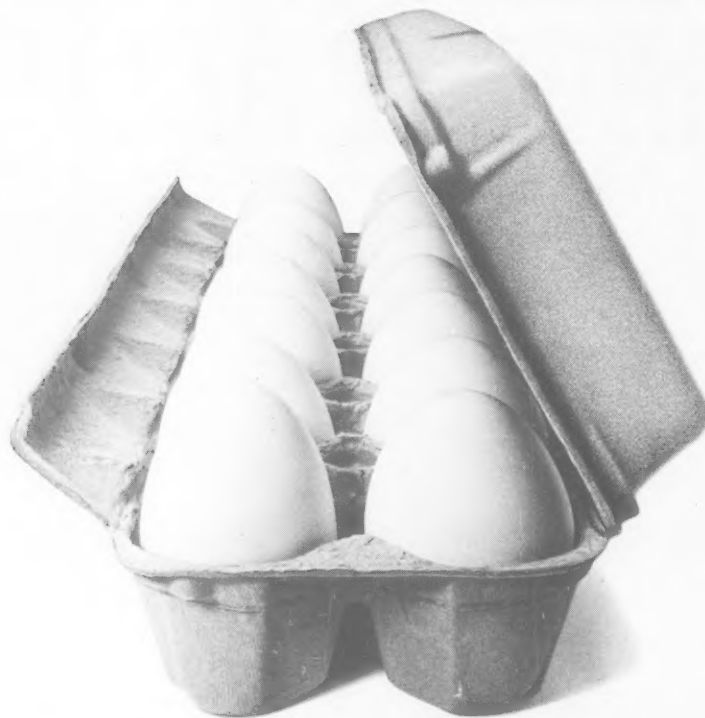
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Olsen Enthusiastic Over DEC's Vision Of Personal Micros



CW File Photo

Kenneth Olsen

By Bill Laberis
CW Staff

BOSTON — With daily production of 500 units per day, soon to rise to 1,000 units per day, Digital Equipment Corp. is "still very enthusiastic about [its] personal computer."

"But, we've got to be a little cautious we don't wipe out all the others with our enthusiasm," DEC President Kenneth Olsen said, as a reminder that the company remains, first and foremost, a minicomputer maker.

Speaking before the Boston Society of Security Analysts recently, Olsen told the 200 luncheon guests that DEC's personal computer offerings represent only one of three primary growth markets the company will target in the near term. The other two high-growth areas — superminicomputers and large disk drives — will continue to comprise the computing backbone of big business, DEC's traditional meat and potatoes market, Olsen indicated.

"Personal computers are different from business computers, and we have to keep that message straight," Olsen told the stockbrokers. "Personal computers are im-

(Continued on Page 100)

Opinions Differ Sharply On IBM Lease Marketing

By Bill Laberis
CW Staff

Is IBM Credit Corp. poised to pull out the stops and assert itself more aggressively than ever in the lease market?

Based on recent activity in the financial markets and on the analysis of some industry observers, the answer might be yes.

But third-party dealers contacted last week say the Credit Corp. has shown no significantly increased market aggressiveness in recent months, nor is it likely to in the near future.

What is known is that Merrill Lynch & Co., Inc., with whom the Credit Corp. allied for funding last summer, has taken on a new partner, Metropolitan Life Insurance Co. According to one analyst, Metropolitan has committed "many, many millions" to the Credit Corp. in the last month via the Greenwich Liberty 1983 Limited Partnership, the name given to the Metropolitan, Merrill Lynch and Credit Corp. partnership. Also, the Credit Corp. recently issued \$100 million in medium-term bonds via a public sale.

One lease market analyst, Charles Greco of International Data Corp. of Framingham, Mass., said Merrill Lynch originally committed \$150 million last summer and, up until a couple of months ago, was concerned over the reportedly slow activity of the Credit Corp. IBM would not comment on Greco's figures.

But now, Greco said, the \$150 million has been "totally used up," and Merrill Lynch and Metropolitan have jointly com-

And Free Enterprise

Reagan Seen Supporting R&D

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — President Reagan's recently proposed budgetary increases for supporting research and development reflect a long-term commitment to R&D in this country, particularly computer sciences and engineering, according to administration science officials.

"The message has gotten across that there are substantial problems in engineering and computer sciences [support]," according to Jack T. Sanderson, assistant

mitted a sum "in excess of \$150 million — way in excess of \$150 million," to finance Credit Corp. leases.

"They are moving now in a very big way," Greco said. "The leasing community might not be aware of these recent developments, because some of them are not necessarily public."

(Continued on Page 102)

DG Draws a Bead On 32-Bit Market

By Ed Scannell
CW Staff

Data General Corp.'s latest leap in the game of technological leapfrog it has been playing with Digital Equipment Corp. over the last three years has once again put the perennial number two maker of

Analysis

minicomputers back into serious contention in the 32-bit market.

With the introduction of its Eclipse MV/10000 two weeks ago, DG President Edson de Castro claimed the company's Eclipse line of computers represents "the most extensive array of 32-bit systems found anywhere."

According to Whetstone single-prec-

(Continued on Page 104)

National Science Foundation (NSF) director for engineering. Sustained growth in NSF funding for these items can be expected for the next few years, he told a recent Institute of Electrical and Electronics Engineers (IEEE) briefing on the federal R&D budget.

NSF budget increases for fiscal 1984 would be 17.8% overall, according to the Reagan proposal [CW, Feb. 7], which Sanderson said would permit the foundation to raise total research grants by 18.4%.

(Continued on Page 102)

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Three Firms Join Forces To Develop Net Standard

IRVINE, Calif. — Western Digital Corp., 3M Interactive Systems and Allen-Bradley have announced a joint effort to develop a broadband token-bus local-area network, which the companies intend to use as an industry standard.

The network reportedly will be based on the recently announced IEEE 802 specification, suited to the special requirements of industrial automation.

The 802 specification is incorporated in the General Motors Corp. manufacturing automation protocol system program, designed to provide common interfacing between a variety of data manipulating and control devices.

Allan Edwin, general manager of 3M Interactive Systems, said his company will introduce a low-cost, high-performance office local-area network in May.

Shaw Forms New Enterprise

SAN DIEGO — Peter J. Shaw, who resigned recently as president of Megatek Corp., has formed a new company that will produce microcomputer-based information processing systems.

Shaw, 36, said he has formed Syte Information Technology, Inc. here, along with former associates from Megatek and an engineering team.

While declining to talk specifically about Syte's products, Shaw issued a prepared statement maintaining that Syte's operations will not be in conflict with Megatek's products or

marketing activities.

Former Megatek associates who have joined the Shaw venture include Bruce Hamilton, former vice-president of engineering.

Olsen Pleased With Micros

(Continued from Page 99)

portant to a business. But for running a business, it's a completely different game."

Reports of both software and hardware problems with DEC's top-line personal computer, the Professional, have surfaced in recent months. DEC has repeatedly denied any major production or software glitches in its personal computer lines, although Olsen alluded to potential problem areas in both hardware and software.

On the manufacturing side, Olsen said several unforeseen problems can crop up when production moves "from zero to 1,000 units per day."

Nevertheless, Olsen expressed confidence that DEC's production schedule for personal computers would be close to company projections for 1983 of about 100,000 units, but did not refer to actual shipment projections.

Regarding the selection of operating software for the Professional, DEC recently announced the availability of an optional card that will allow the Professional to run under Digital Research, Inc.'s CP/M 80 operating software. When announced, the Professional featured DEC's own Professional Operating System (P/OS), a subset of the company's RSX operating system.

Users now are more attracted to DEC's low-end personal computer, called Rainbow, than to the Professional, largely because Rainbow features CP/M, for which several application packages have been written and tested. Independent software houses have reportedly been slow in tailoring application packages to DEC's operating system for the Professional (CW, Jan. 24).

Shifting gears, Olsen said DEC's intention to support Bell Laboratories Unix operating system on DEC's VAX superminicomputers has proven a source of "tremendous turmoil internally," as DEC's in-house software development team feels its own operating software is far superior to the more generically popular Unix. As the internal debate continues, Olsen said he is inclined to offer both Unix- and VAX-like operating software. "And I'm winning," he quipped.

Olsen said further that DEC is busy expanding the VAX family with a "much larger, faster VAX" that is "still a year or two away" and is pressing ahead with development of a VAX on a chip with which the company will produce what Olsen called "the ultimate personal computer."

Ironically, as he spoke, Data General Corp. was unveiling a top-line superminicomputer, said to be 50% more powerful than DEC's biggest VAX, the 11/780 (see story Page 99).

Commenting on that announcement, Olsen said, "We never look over our shoulder" at Data General.

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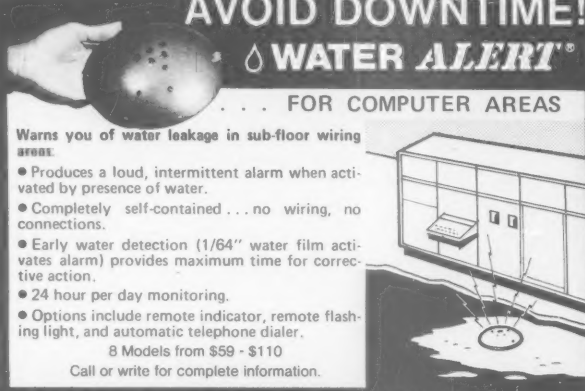
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Reagan Seen Bolstering Commitment to R&D

(Continued from Page 99)

Commenting on these increases, Dr. James Ling, senior policy analyst with the White House Office of Science and Technology Policy, said the budget proposal reflects "a clearly articulated science policy" of the administration and is not a one-year spike in funding levels.

But Ling also told the IEEE meeting the administration will continue to adhere to a conservative R&D support policy, which emphasizes getting the most for its limited resources and financing only those research projects considered vital to the U.S. and which would not be undertaken by the private sector.

"The emphasis today really needs to be not on expansion [of R&D capabilities and facilities] but [on] how do we get more out of what we already have," Ling said, arguing for "quality not quantity."

Ling noted that the 1960s and 1970s saw "a massive infusion of federal funds" into university research and he suggested that the White House would like to see a return to greater reliance on private-sector support.

Asked if the growing government support for R&D in competing countries, especially Japan, does not challenge the government to increase its R&D funding even more, the senior policy analyst responded that the Reagan administration wants to preserve the free enterprise, entrepreneurial character of American science and technology.

"It's clear the administration doesn't want to turn the U.S. into another Japan," Ling said.

Opinions Vary On IBM Policy

(Continued from Page 99)

Greco said the \$150 million he claims Merrill Lynch committed last summer represents only the leveraged portion of leases written.

With the funds generated both internally and through Greenwich Liberty, Greco said the Credit Corp. "could write from \$500 million to \$1 billion" in leases in 1983, placing the Credit Corp. in the top three computer leasing companies.

The third-party dealers disagreed with Greco's analysis — and sharply so.

George Heilborn, president of IPS Computer Marketing Corp. and former president of the Computer Dealers and Lessors Association (CDLA), said IBM has not exhibited a significant increase in lease market aggressiveness in recent months.

Heilborn added that some analysts have "made too much" of Credit Corp.'s presence in the lease market.

Further, Heilborn said the majority of the Credit Corp.'s business is in funding the so-called Installment Purchase Agreements (IPA) and not the Term Lease Agreements (TLA) that compete directly in the third-party lease market. IPA are typically 48-month agreements by which IBM customers purchase equipment in installments, as opposed to the TLA, which are strictly lease-based.

Kenneth Pontikes, another CDLA member and president and chairman of Comdisco, Inc., said he has sensed "no great change" in the Credit Corp.'s lease activities in recent months.

In an interview last November, Pontikes said the Credit Corp. is a significant, but not dominant force in the lease market.

Regarding the \$100 million the Credit Corp. is raising with its recent bond issue, Pontikes said, "The Credit Corp. is like any other finance company. It needs that kind of money to handle its regular operations. It's really no big thing."

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Industry Execs Lobbying For Rewrite of Export Act

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Computer and electronics industry representatives gathered in force on Capitol Hill recently to begin their push for streamlined export controls as Congress intensified efforts to rewrite the soon-to-expire Export Administration Act.

The industry executives told a Senate banking subcommittee March 2 that high-technology firms support export controls that deny unfriendly nations militarily useful technology and products as long as enforcement of those controls does not interfere with trade between the U.S. and its allies. The spokesmen suggested a number of changes to the existing export law that they said would accomplish that goal.

In several hearings already completed, federal agency officials, particularly from the U.S. Commerce Department, which has the prime role in administering the 1979 export control act, have assured Senate and House of Representatives subcommittees that the government has solved many of the licensing problems that have caused uncertainty and lengthy delays for U.S. exporters.

High-technology companies, however, clearly are not convinced the situation has improved; they maintain that overly broad export controls and time-consuming licensing procedures have made U.S. firms unreliable suppliers to customers in friendly nations.

The purpose of the export controls is to deny militarily useful high technology to adversary nations, particularly the Soviet Union. The main complaint of the electronics industries is that the controls cover too many types of technology to be practical and effective, do not take into account the availability of many controlled items from foreign suppliers and include technologies and end products that are not state of the art.

"We have always accepted the necessity for an export licensing system that meets U.S. national security needs," J.A. DeRose, IBM program director of public affairs and chairman of the Semiconductor Industry Association (SIA) export control subcommittee, told the Senate Banking Subcommittee on International Finance and Monetary Policy. But, he said, "we are deeply concerned that excessive controls may be imposed ... which would seriously hinder the ability of U.S. firms to compete internationally."

The export control philosophy suggested by DeRose and representatives of the Computer and Business Equipment Manufacturers Association (Cbema), the Electronics Industry Association and the American Electronics Association emphasizes enforcement of controls, agreed to multilaterally by the U.S. and its allies, on goods that might reach the Soviet Union and other unfriendly countries, while at the same time seeking relaxed controls on trade with friendly nations.

Summing up his association's position, Cbema President Vico Henri-

ques said: "National security export controls can only be effective if our country's enforcement efforts concentrate on products and technical data that are truly militarily critical, if multilateral controls focus on East-West trade in items that are not available outside the U.S. and through voluntary compliance and cooperation between the U.S. government and U.S. exporters."

Henriques and DeRose urged Congress to establish a new "comprehensive operations license" — a two-year renewable license for an individual company's exports of critical technologies to Western and other friendly nations. As described by SIA, the new license would in effect be government approval of a firm's own export control practices.

"Exporters would submit an application with a broad description of the items involved, a description of the company's internal control system, copies of the operating agreements with its network of foreign consignees and supporting statements from the consignees," DeRose told the subcommittee.

Henriques pushed the comprehensive operations license concept by arguing that "any new government controls must recognize existing commercial safeguards governing the treatment of ... technology if they are to be effective. By creating a comprehensive licensing mechanism for technology, these proprietary systems can become the foundation for controlling the transfer of technology."

Customs Head Addresses Delays

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The head of the U.S. Customs Service has promised a quick end to the delays its export control enforcement efforts, designated Operation Exodus, have caused U.S. exporters. The shipment seizures and delays have infuriated high-technology companies.

Appearing before a joint hearing of two House trade subcommittees March 1, Customs Commissioner William von Raab said his agency has been very successful in reducing the illegal flow of U.S. technology abroad "with minimal effects on the export community in this country." The hearings were part of congressional efforts to redraft the 1979 Export Administration Act, which expires in September [CW, Feb. 14].

A number of electronics firms, particularly small ones unable to weather financially the long delays in completing export deals, have taken the Customs Service to task for Operation Exodus, describing Customs agents as untutored goon squads with dangerous weapons. A congressional assessment of the Customs Service's operations will be critical to the export act rewrite because some legislative proposals would transfer all export law enforcement

(Continued on Page 104)

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Customs Head Promises End to Export Delays

(Continued from Page 103)
authority to the Customs Service. Some authority now resides with the Commerce Department, which the industry generally finds more amenable to the needs of exporters.

Commissioner von Raab told the subcommittees the first phase of Operation Exodus, which concentrated on outbound cargoes, "has resulted in increased compliance with the nation's export laws."

Exporters are now more aware of their responsibility, particularly under the Export Administration Act, and though a few export shipments have been delayed as a result of this program, these delays should diminish substantially in the near future, he said.

The Customs Service continues to educate its inspectors to better recognize particular exports that might violate the law.

The Service will introduce

minicomputers in the field in the near future so that inspectors can immediately determine the licensing status of a commodity, von Raab added.

To date, von Raab said, Operation Exodus has resulted in 2,481 detained shipments, out of 9.9 million total shipments.

Of those detained, 765, valued at approximately \$55 million, were seized, von Raab noted.

The planned second phase

of Operation Exodus, according to von Raab, will focus on investigations and intelligence.

A third phase will be to rely more heavily on foreign Customs Service offices to

investigate violations of U.S. export laws, particularly violations involving diversion of controlled items from intended recipients to unfriendly nations, according to von Raab.

TI Endures \$50 Million Ill

DALLAS — Texas Instruments, Inc. said transformer problems on its 99/44A home computer will cost the firm about \$50 million in 1983.

TI, which halted production of the 99/44A on Feb. 17, said pretax earnings for the firm will be down nearly \$50 million with the heaviest impact coming in the first quarter.

The lower revenue is expected from loss of sales on the 99/44A along with loss of sales on peripherals.

TI stopped selling the home computer when it discovered transformer problems could give users electrical shocks or cause damage to the hardware, a spokesman said.

DG Sets Sights on Top Spot in 32-Bit Market

(Continued from Page 99)
sion benchmarks, the MV/10000 has twice the processing power of DG's previous high-end model, the MV/8000, while costing only 15% more. The benchmarks also show the system is twice as fast as DEC's high-end supermini, the VAX-11/780, a machine considered by some industry observers to be the de facto standard among 32-bit scientific machines.

Not only will the general purpose system be competing against the VAX-11/780 for a larger slice of the scientific market, but it will also be competing against Wang Laboratories, Inc.'s minicomputers for a share of the office automation market.

"What is interesting about this announcement is the way DG is going after the office automation market as well as the scientific market with this machine," notes Venture Development Corp. analyst Tim McMahon.

McMahon contends that, with the exception of Wang, no other superminicomputer manufacturer has gone after the office automation market as aggressively as DG has with its MV series. "It is quite a reasonable strategy if they can retain some of their current [scientific] customers and at the same time get into new application areas [such as office automation] that are growing quicker than scientific and computational ap-

plications. It appears to be a good move," McMahon asserted.

Peter Lowber, senior market analyst for The Yankee Group, agrees with McMahon that the MV/10000 will have an impact on the mar-

Analysis

ket and that DG is doing the right thing by demonstrating a strong commitment to the office automation market.

"Obviously, this machine sets a new performance level and is priced only 15% higher than the original MV/8000 price," Lowber contended. "I think what a lot of these vendors have to do is get into the commercial market through office automation. That is the strategy of both DEC and DG," he added.

While he thinks the Comprehensive Electronic Office (CEO) package — DG's office automation software — is better than DEC's All-In-One office package, Lowber thinks DEC has a better chance at succeeding in the office automation market because of its superior distribution resources and the availability of its microcomputers.

"They [DG] don't have any retail or distribution strategy and they don't have a microcomputer yet. You

might be able to generate a VAX sale through someone that bought a DEC personal computer through a retail outlet," Lowber said. "It's nice and dandy to have a huge MV/10000, which is going to help DG's superminicomputer reputation, but what are they going to do about distribution?"

Lowber also felt that the MV/10000's pricetag of \$211,000 makes it too big a risk even for the Fortune 1000 companies. "The Fortune 1000 companies aren't going to go off and invest that kind of money in a high-end system until they know that system meets their needs and works. In a lot of ways the MV/4000 [priced at \$8,000 with CEO] should open up doors more quickly than the MV/10000," Lowber stated.

There is no indication DEC will counterpunch DG's MV/10000 announcement by introducing a follow-up to its VAX-11/780. The minicomputer leader seems more content these days to concentrate its efforts on its microcomputers and putting the VAX on a chip.

"And they are absolutely right to do that," Lowber said in commenting on DEC's efforts to put the VAX on a chip. "You want to have a professional workstation that is the jack of all trades: it would be a terminal, a local or personal data base ma-

chine, a local applications processor but it would have access to data bases elsewhere including SNA [IBM's Systems Network Architecture] support. Here is where Data General has to pay attention," he concluded.

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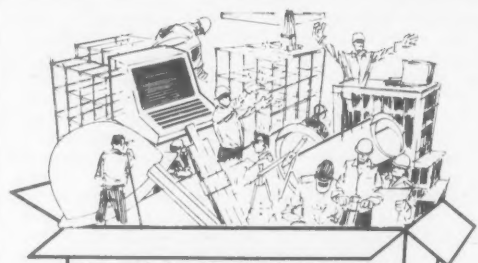
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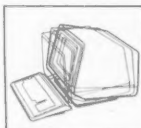
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Contracts & Pacts

Oki Electronics of America, Inc., Ft. Lauderdale, Fla., and Standard Telephone Co., South Hackensack, N.J., have signed a marketing and distribution agreement giving Standard Telephone exclusive distribution rights in most of the Northeast U.S. to Oki's Spectrum 700 and 4000 digital switching systems.

Fairfield Industries, Inc. and Continental Telecom, Inc. will acquire Western Union, Inc.'s interest in Space Communications Co., the Maryland-based firm that will operate and manage the Tracking and Data Relay Satellite System for the National Aeronautics and Space Administration.

Aydin Corp. has received awards totalling \$4.2 million from Communications Satellite Corp. for satellite link-up hardware.

Computerland Corp. will distribute Lotus Development Corp.'s Lotus 1-2-3 software through its network of retail stores under terms of a recently signed agreement.

TRW, Inc. has selected Computer Development, Inc.'s Executive Telecommunication System 3000 and related software to be implemented into the TRW office automation program.

Siecor Corp. has been chosen by Digital Equipment Corp. to supply cables for its first fiber-optic network product, the DYX02 Decdataway optical interface. Siecor will also provide engineering and installation services to assist Decdataway users.

Digilog Business Systems, Inc. has selected Intel Corp.'s IAPX 186 16-bit microprocessor and Digital Research, Inc.'s CP/M-86 operating system for its next generation of desktop business computers.

Digital Equipment Corp. has added Basis-OA, an electronic library retrieval system, to its department office system, All-In-1, under terms of a joint marketing agreement signed with Battelle Memorial Institute's Columbus (Ohio) Laboratories.

Codata Systems Corp., Sunnyvale, Calif., will supply Interactive Images, Inc., Woburn, Mass., with an undisclosed number of Motorola, Inc. 68000/Bell Laboratories' Unix-based CTW-300 microcomputer systems under a recently signed \$1.5 million contract.

Vista Computer Co. has signed a two-year agreement with Amlyn Corp. of San Jose, Calif., to purchase more than \$5 million of Amlyn's multidisk floppy disk drives.

Honeywell, Inc. has been awarded a \$50.9 million contract by the Air Force Computer Acquisition Center to provide a Honeywell ADPS, Model DPS 8/70 and support services for the Advanced Personnel Data System managed by the Air Force Manpower and Personnel Center, Randolph Air Force Base, Texas.

Intel Corp. has signed a contract with Zentec Corp. for the purchase of customized versions of Zentec's Cobra terminal system.

Micro Peripherals, Inc. has been awarded a \$5.5 million contract by Direct, Inc. to supply 5¼-in. flexible disk drives for a desktop intelligent multiple-purpose workstation.

Amnet, Inc. has been awarded an additional \$1.4 million contract from the Swedish Defense Materiel Administration for an advanced packet-switching data communications network. The firm has been awarded over \$3 million to date for the installation of the X.25-based private data network.

Computervision Corp., Bedford, Mass., has received a \$1 million order for computer-aided design and manufacturing equipment from Atari, Inc., a subsidiary of Warner Communications, Inc.

Computer Input Services, Inc., Upper Darby, Pa., has received orders from the American Cancer Society, Toys R Us, the Service Station Dealers of America and the National Association of Retail Dealers for its data entry and credit card processing services.

Hewlett-Packard Co. has signed a contract to purchase Ethernet local-area network communications products from Ungermann-Bass, Inc. HP will use the products in its HP 9000 series of 32-bit computers.

General Electric Co. is providing factory-authorized leasing, sales and service for Racal-Vadic, Inc.'s VA4400 series of quad modems.

Plexus Computers, Inc., Santa Clara, Calif., has signed a \$2 million agreement to supply Southwest Modular Systems, Inc. with P/35, P/60, P/25 and P/40 multiuser microcomputers operating under Bell Laboratories' Unix System III.

Western Union's Field Service Division will provide exclusive on-site installation and service for Transaction Processing, Inc.'s 3600 and Diplomat point-of-sale computers.

Altos Computer Systems, Inc. has signed a \$1.2 million agreement to supply its Altos 586 16-bit microcomputer to 3Com Corp., Mountain View, Calif. 3Com will use the microcomputers as "network servers" that will allow IBM Personal Computers to be linked into a Xerox Corp. Ethernet network.

Priam Corp. has signed a two-year, \$3.1 million contract with Cado Systems Corp. to supply the firm with an undisclosed number of 14-in. Winchester disk drives.

CIE Systems, Inc. has signed two OEM contracts totaling \$4.7 million for its CIES 680 single- and multiuser systems with Grand American, Inc., El Toro, Calif., and Computerway, Inc., Zurich, Switzerland.

Buying Binge Over

M/A-Com Hiking R&D Outlays

By Paul Gillin

CW Staff

BOSTON — Earnings at M/A-Com, Inc. will be lower in 1983 than in the depressed year of 1982. However, the company is continuing to pour money into research and development in anticipation of a 1984 rebound.

That was the message from Richard T. DiBona, president and chief executive officer (CEO) of the Burlington, Mass.-based manufacturer of telecommunications equipment, at the annual shareholders meeting held here earlier this month.

DiBona said M/A-Com is settling down to digest its new acquisitions following a buying binge that continued from 1978 until early this year. "New acquisitions, if any, will be made on a highly selective basis," he said.

Acquisition and divestiture activity continued through the first two quarters of fiscal 1983, DiBona noted. In the last four months, M/A-Com has sold the Ohio Scientific computer company and the Prodelin, Inc. antenna and cable company. It also dropped interests in the Cylix Communications Network and Valtec Corp., a fiber-optic cable company. Further, the company became sole owner of Local Digital Distribution Co., a supplier of digital telecommunications equipment.

Economy Blamed

DiBona blamed "adverse economic conditions" for a slump that caused M/A-Com earnings to fall 3% to \$41.3 million in 1982. The slide continued in the first quarter of 1983, with income dropping 38% from the same period last year.

But the CEO sought to allay investors' fears by restating the company's goal, "to become the leading worldwide telecommunications corporation during this decade." He said he was recommending a one cent increase in the quarterly dividend to

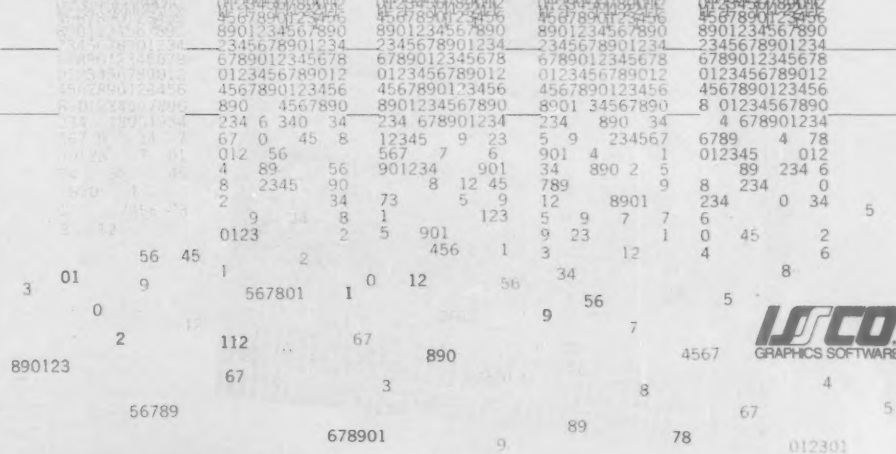
five cents per share.

DiBona announced that M/A-Com has reached an agreement in principle to supply hardware to General Instruments Corp. for a \$600 million direct broadcast satellite contract award, which that company recently received from Universal Subscription Television, Inc. M/A-Com also announced recently a \$28 million contract

for digital satellite communications equipment from Southern Pacific Communications Co.

DiBona said M/A-Com expects to benefit from the breakup of AT&T into seven operating holding companies next year. Petitions filed by regional Bell operating companies to build DTS have specified M/A-Com Equipment, he said.

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Nickels & Dimes

The board of directors of **Wang Laboratories, Inc.** has voted to increase the quarterly dividend on class B common stock from 2 cents to 25 cents per share and the class C quarterly dividend from 75 cents to \$1.25 per share, payable May 2, 1983.

\$\$\$

Apollo Computer, Inc. has filed a registration statement with the Securities and Exchange Commission cov-

ering a public offering of 3 million shares of common stock, 2 million to be sold by the company and 1 million by certain shareholders.

\$\$\$

Seven venture capital firms and two private investors have provided **Telmos, Inc.** with \$3.6 million in capital funding. Investors included Banque Darier Et Cie, Switzerland; New Enterprise Associates, San Francisco;

Ventech Partners L.P., New York; **Montgomery Securities**, San Francisco; **Montgomery Ventures**, Cupertino, Calif.; **Abingworth Management, Ltd.**, London; and **Interven SA**, Luxembourg. E. Kleiner and Dr. J. Last (Fairchild founders) provided private funds.

\$\$\$

Northern Telecom, Inc.'s board of directors has declared a first quarter 1983 dividend of 30 cents per share of common stock, a 20% increase over the amount paid per share each quarter in 1982.

\$\$\$

Bridge Communications, Inc. has raised \$4 million in its second round of venture capital funding. Investors included Weiss, Peck and Greer-Lawrence; Merrill, Pickard, Anderson and Eyre; E.M. Warburg, Pincus and Co.; **Interwest Partners**; **Matrix Partners**; **Institutional Venture Partners**; and **Citicorp Venture Capital**.

\$\$\$

Walker Interactive Products, Inc. has received a total of \$4.8 million in venture capital funding from **Alden & Co.**; **Kleiner, Perkins, Caulfield & Byers**; and **Technology Venture Investors**.

\$\$\$

Drivetec, Inc. has secured \$3 million in equity funding. The leading investor was **Hambro International Venture Fund**, New York. Also participating were **Advanced Technology Ventures**, Menlo Park, Calif., and **Bay Partners**, Mountain View, Calif.

\$\$\$

Emulex Corp. has announced a 97% increase in revenues and a 128% increase in net earnings for the second quarter, 1983, over the same quarter last year. Earnings per share were up from 22 cents per share to 40 cents per share over the same period.

\$\$\$

Camex, Inc. has completed \$6.2 million in financing through the sale of common stock and a \$2 million unsecured three-year revolving credit line from the **First National Bank of Boston**.

\$\$\$

The board of directors of **Emulex Corp.** has authorized a two-for-one split of its common stock, effective Feb. 8, 1983.

\$\$\$

Cullinet Software, Inc. (formerly **Cullinane Database Systems, Inc.**) has announced that revenues for the three months ending Jan. 31, 1983, increased 62 cents compared with the same period last year. Net income for the quarter was \$3,025,000, a 51% increase over last year's \$2,007,000.

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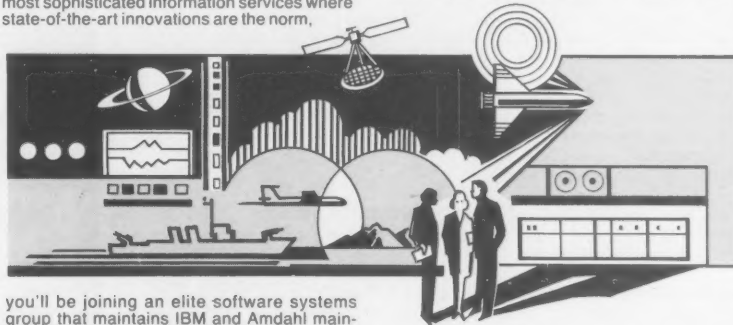
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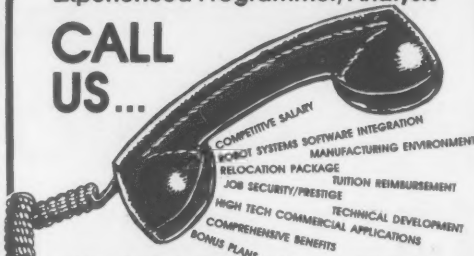
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The selected candidates will design and develop on-line transaction processing systems. A requirement of 5-10 years experience in several of the following areas needed: operating systems, structured system design, on-line transaction processing (e.g., CICS, ENVIRON/I, GEM-COS), distributed networks (e.g., Tandem, HP, PE, DEC), or systems documentation. Assembly language and COBAL preferred.

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Personnel Services
University of Georgia
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Project Architect for the design of architecture, logic and circuits for computers and peripherals. BS/MSEE and 8+ years directly related experience required.

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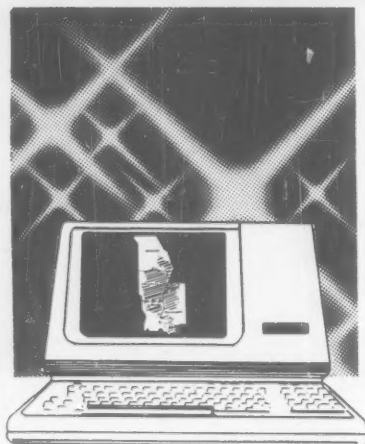
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Reply to CW-B4 103
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EOE/MF

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Working with user personnel, you'll determine information requirements and operational needs, as well as aid in planning, defining, analyzing and implementing business systems. Requires 2+ years experience as a Systems Analyst along with a thorough understanding of the logical design in IMS DB/DC. Knowledge of ADF, Data Dictionary concepts, Mark IV, Parvalet would be a plus.

ANALYST PROGRAMMERS

The ideal candidates would possess 3+ years experience with COBOL, IMS DB/DC, plus 3 years experience with Business Applications or plant maintenance systems. Knowledge of ADF, Data Dictionary concepts, Mark IV, Parvalet would be a plus.

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For a prompt response, send a resume indicating salary history/requirements to: M.O. DePalma, NCR Corporation, 6777 Oakbrook Blvd., Dallas, Texas 75235.

NCR

Complete Computer Systems
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Programmer Analyst Long Beach/So. Bay Area

Recent expansion to our data processing department has generated our need for an experienced Programmer Analyst. Initial responsibilities will include installing and modifying systems with manufacturing and financial applications.

Qualified candidates should possess an applicable bachelor's degree or technical school training, with a proficiency in COBOL, and a required minimum of 3 years data processing experience with HP3000 background a plus.

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More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

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Northern Arizona University and the Arizona Public School Computer Consortium are seeking a Programmer Analyst II. Extensive knowledge of COBOL and 4-7 years experience/education preferred. Knowledge of Database and Honeywell CP6 or CP5 operating systems helpful. Knowledge of school applications helpful. Excellent salary and fringe benefits. Enjoy living in the beautiful mountains of Northern Arizona and working in a University environment. Apply or send resume to:

**Northern Arizona University
Personnel Department
Box 4113
Flagstaff, AZ 86011**

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Tricom Systems Corp. is one of the fastest growing computer systems companies in America. This is an excellent opportunity in applications programming with tremendous growth potential. Excellent salary and stock options available.

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Computerworld
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LOUISIANA TECH UNIVERSITY**

Nominations and applications are invited for the position of Professor and Head of the Computer Science Department at Louisiana Tech University. Qualifications of applicants must include an earned doctorate in Computer Science, experience as a member of a teaching faculty and a record of scholarly achievements. Candidates must also have a demonstrated commitment to excellence in teaching, research and service and the ability to work effectively with faculty, students and administrators.

Applicants should submit resumes, including a list of three references:

**C. Ray Wimberly, Dean
College of Engineering
Louisiana Tech University
P.O. Box 10344, TS
Ruston, LA 71272**

The deadline for receipt of applications is April 1, 1983.

Louisiana Tech University is an EEO/AA employer.

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Our positions are diverse. We have openings for Programmers, Applications Analysts, Systems Engineers, Technical Leaders, and much more. Most positions require a Computer Science or related degree plus several years of hands-on experience or equivalent training and experience. In addition to a challenging work assignment, we offer excellent salaries and a comprehensive benefits package. If you're ready to join our quality software team, test the worth of your experience by sending a resume to one of the following locations:

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**SPERRY UNIVAC-TSD
Attn: Bob Elmer
Mail Station CD2C01
P.O. Box 43525
St. Paul, MN 55164**

For Eastern U.S. Positions:

**SPERRY UNIVAC-TSD
Attn: Barbara Glover
Dept: CW
1901 N. Moore St.
Arlington, VA 22209**

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Qualified candidates will have a BS degree in computer science or related field and have 4+ years experience in communications and mini-computer environment designing and building real-time applications. Knowledge of Intel 8088 assembly language and C language desirable. The wide range of responsibility includes specification, development and documentation of communications oriented applications as well as some project leader duties. Please send your resume including salary requirements in confidence to: Mrs. Kilderry

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AND SUCCESS!**

**PROGRAMMER/
CHEMIST**

The Upjohn Company, Kalamazoo, Michigan, a world-wide producer of pharmaceuticals, has an opening in its Drug Metabolism Research unit for a computer programmer with a strong background in chemistry and statistics. The individual filling this position will be responsible for design and development of computer programs and systems for use on a large central laboratory automation computer system. The incumbent will be involved in the management of computer files of analytical data.

Applicants must have a B.S. or M.S. degree in chemistry, physics, computer science or mathematics and should have several years' experience in programming of computers. Ability to communicate with professionals in other disciplines is essential. Knowledge of statistics and kinetics is highly desirable.

Kalamazoo is a medium-sized southwestern Michigan community with immediate access to a mix of excellent cultural, educational, and recreational pursuits, including numerous lakes and a four-season climate. Upjohn offers an excellent salary, commensurate with experience, and an outstanding benefits program.

For confidential consideration, please call from outside Michigan toll free: 1-800-253-8600, ext. 36767; or call from Michigan collect: 616-323-6767 to request a specialized employment application be sent to you immediately. Please refer to ad number 14710-B when calling.

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Reporting directly to the V.P. Engineering, this individual will be responsible for the total systems function including hardware, software and personnel.

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Box 880**

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**MICR
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Multibank Service Corp. provides financial data processing services to affiliated banks throughout Massachusetts. As a result of company growth and internal promotions, we are presently seeking qualified candidates for the following positions.

Sr. Programmer/Analyst

Will serve as lead programmer on Check Processing Control System (CPCS). Must have minimum five years of programming experience and detailed knowledge of large MICR processing systems. CPCS experience highly desirable.

Programmer/Analyst

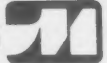
Will support and modify CPCS system. Two to five years of programming experience on large MICR processing systems required.

In addition to growth opportunities, Multibank Service Corp. offers competitive salaries and an extensive benefits package including a matching thrift fund and dental coverage.

Please forward resumes, including salary requirements, to Jean Lever, Director of Personnel.

**P.O. Box 285
11 Midstate Drive
Auburn, MA 01501
(617) 832-5344**

**MULTIBANK
Service Corp.**

**SYSTEMS PROGRAMMER/
MANAGER**

The Institute for Advanced Study, located in Princeton, N.J. is seeking an experienced Systems Programmer to take charge of a small computing facility including a DEC VAX 11/780 computer system and a number of work stations. The position will become available June 1, 1983.

Responsibilities include:

- manage all resources of the computer center
- perform system generation and software maintenance
- deal with manufacturers on hardware problems
- assist our Scientists and Secretaries in their use of the computer
- write small systems programs that will make the computer easier to use
- write manuals and documentation

Requirements include:

- a thorough knowledge of the DEC VAX/VMS or UNIX operating system
- a thorough knowledge of FORTRAN and Assembler
- some familiarity with C preferred, but not required
- 3 years experience in related areas
- a college degree

This position offers an outstanding opportunity for an enthusiastic individual who would like to run a user-oriented computer center. This person will be working with prominent Scientists and Scholars at one of the foremost research institutions in the world. The Institute is located in one of the most beautiful areas of Princeton and offers an exceptional working environment.

Salary \$30,000 or commensurate with experience. Send resume to:

**Mr. James Barbour
Personnel Office**

**THE INSTITUTE FOR ADVANCED STUDY
10 OLDEN LANE, PRINCETON, NEW JERSEY 08540
(609) 734-8193**

The Institute for Advanced Study is an Equal Opportunity Employer.

DIRECTOR OF ADMINISTRATIVE COMPUTER CENTER

Amherst College invites you to submit your qualifications for the position of Director of Administrative Computer Center. Your primary and immediate responsibility will be the upgrading of the College's administrative computer information program. Your experience should include demonstrated ability to manage a staff of about 17 employees who perform systems, programming, operations and support functions. Knowledge of IBM 4300 series equipment, familiarity with integrated database systems and experience with word processing and text-processing systems is necessary. Communication skills are considered very important to the position. There is a cooperative relationship with the Administrative Computer and Academic Computer Centers of the College. An undergraduate degree is required.

Amherst College is located in Amherst, Massachusetts near the foothills of the Berkshire mountains, yet it is only about 100 miles from Boston and 125 from New York. It is part of the five college cultural area that includes UMass, Hampshire, Mount Holyoke and Smith Colleges.

If you believe you have the leadership and technical qualifications for this position please send your resume to David F. Howland, Personnel Officer, Amherst College, Amherst, Massachusetts 01002, who is coordinating the search. All inquiries will be acknowledged. The selection will be made by the Treasurer with the aid of a Search Committee.

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Central Ohio Technical College is searching for two Computer Programming instructors. One position is tenure-track, the second is an anticipated one year temporary appointment. Position responsibilities include instruction, curriculum development, and student advisement. A minimum of a Bachelor's Degree is required. Master's Degree is preferred. Appropriate academic or work experience may be substituted for the Master's Degree. Hardware in use is DEC PDP 11/70, running RSTS/E. COCT is a two year, state supported, autonomous technical college with approximately 1300 full and part-time credit students, of which 300 are computer students. The College has a three county service area and shares a 155 acre campus with the Ohio State University at Newark, a community of 50,000 people 35 miles east of Columbus, Ohio. Salary commensurate with degree(s) and experience. To insure consideration, forward a letter of application and a resume by Friday, April 8, 1983 to Personnel Coordinator, Central Ohio Technical College, University Drive, Newark, Oh 43055. COCT is an EEO/AA employer.

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Fox-Morris specializes in the placement of all programmers and systems analysts. Our present openings are with Top Fortune 500 companies with special emphasis on NEW START-UP opportunities on a local and regional basis. For a clear understanding of our client's needs and to know your true value in today's market, call Robert Montgomery at 919/872-2940 or send resume to

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As a member of our Software Development team, you'll work on real-time, military electronic systems. On applications that range from air traffic control to signal processing. From ergonomics to jamming and direction finding systems. With future applications that include office automation and bit map graphics. At Sanders, the spectrum of projects we have going at any given moment is positively mind-boggling.

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To provide technical leadership on projects involving the development of software for minicomputer and/or microprocessor based military electronic systems or computer applications systems. Will participate in Requirements Analysis and definition, system design and specification, project costing and scheduling, software implementation, and test integration. Requires BS in EE, CS, Math or Physics and 8-10 years of applicable experience.

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To perform mathematical modeling, performance prediction, and algorithm development applied to Sanders' systems and devices. Particular areas include Digital Signal Processing and Sequential Estimation Techniques applied to tracking and identification applications. Duties include analysis of customer specifications and synthesis and evaluation of algorithms to meet those specifications. Customer applications include signal exploitation, air traffic control, ASW systems, training systems, and automatic test equipment. Requires BSEE/BSCS/BS Math/BS Physics and 6-10 years of experience.

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Microprocessor based systems applications. Experience with Intel 8080/8086 and MC68000 or other state-of-the-art micro CPU's. Practical knowledge of assembly languages as well as high level languages required. Microprocessor hardware interfacing ability a plus.

Several positions available for Software Engineers to work on microprocessor based system applications. Experience should include assembly and high level language development for the Intel 8080/8086, MC68000, and/or LSI 11/23 processors. Microprocessor hardware interfacing techniques a real plus. Applicant must have a BS degree in CS or EE, advanced degree desirable.

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Send your resume with salary history, specifying position of interest, to Sanders Associates, Inc., Box 153DG, 95 Canal Street, Nashua, NH 03061.

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Jartran is offering an exceptional opportunity for an intermediate MVS Systems Programmer to help support our technical team. If you would enjoy the exciting year-round outdoor activities that are a part of South Florida living, then consider discussing career opportunities with us.

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IBM 3031 MVS OS/JCL VTAM IMS DB/DC JES2 TSO/SPF COBOL

Agency referrals not accepted. Submit resume to:

Valerie Friedman
MIS Department
JARTRAN, INC.
P.O. Box 343799
Coral Gables, FL 33134



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If you have been looking for an opportunity to expand your career horizon, we want to talk to you about becoming a part of a nationally recognized regional brokerage firm. Our expanding technology research and investment banking activities have created a need in our research department for an individual with a technical background and technology market segment knowledge in the areas of computers, computer services and software. This position will report to our Senior Technology Analyst and provides a concrete career path leading to full Senior Analyst responsibilities. An undergraduate engineering, math or computer sciences degree and an MBA or graduate business degree are desired, as well as solid work experience including 3-5 years in a consulting or corporate environment. Prior employment in a product development or marketing capacity in a technology oriented company or consulting firm is a most definite asset. We offer excellent compensation and fringe benefit package. Please send your resume in confidence with complete salary history to:

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Attn.: Director of Personnel
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Applicants need a bachelors degree in Park and Recreation Administration, Public Administration, Resource Management, Urban Planning and/or Computer Science. Must have 5 years experience in a combination of the preceding areas. Familiarity with SAS and facility in COBOL are essentials. Small mini-computer or personal computer knowledge desirable.

Salary \$25,260 - \$32,280 depending upon qualifications.

Interested applicants should submit detailed resume by Friday, March 18, 1983 to:

Staffing Manager
Personnel Department
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Dallas, Texas 75201



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- ASC11 COBOL
- DMS 1100
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- DML, QLP
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Analyst, Design, Administrators with above hardware, software and applications experience.

These opportunities exist at our Michoud Assembly Facility located in suburban East New Orleans.

Qualified candidates interested in learning more about these opportunities at Martin Marietta should forward resumes, including salary history to Martin Marietta Aerospace, Denver Glazier, CW-314, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

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Assistant Diagonal Associate Professor of Math Diagonal Computer Science starting August 25, 1983. Teach advanced and intro computer science courses. Master's in computer science required; Doctorate required for advancement in rank. Preference to those committed to teaching excellence, familiar with the PDP-11 machine family, and having senior-graduate level course work in combinatorics or graph theory. Apply to Ron Loefer, Math Department, Adams State College, Alamosa, CO 81102. Closing date for application materials to reach ASC is May 2, 1983.

The City of Las Cruces, NM (52,387 MSA pop.) has a vacancy for Director, Management Information Services. Minimum requirements are: BSCS or related degree and (4) years as manager of an electronic data processing unit, or management analyst utilizing electronic data processing. Will head a data processing center and duplicating services section. Salary: \$26,000-\$31,000 per annum, D.O.E., & employee benefits. Send current resume by 31 March 1983 to:

Personnel Department
P.O. Drawer CLC
Las Cruces, NM 88004
An EEO/AAEP Employer

Instructor, Assistant or Associate Professor

The College of the Virgin Islands, St. Thomas Campus, is seeking an Instructor, Assistant or Associate Professor of Data Processing (non-tenure track) for August 15, 1983. A Ph.D. in Information Systems, Computer Science, or related field and industry experience are desirable. Masters degree and teaching experience acceptable. Must be qualified to teach at least two of the following: COBOL and/or RPG programming, systems analysis and design, information organization and processing, operating systems, or computer hardware and communications. Assignment includes 12 teaching credit hours per semester in data processing and related business administration courses in either the associate, undergraduate or graduate degree program. Rank and salary commensurate with qualifications and experience. Send letter of application, resume, transcript and three letters of recommendation by April 15, 1983 to Mrs. Magdelene Bryan, Chairperson, Business Administration Division, College of the Virgin Islands, St. Thomas, US Virgin Islands 00802. An affirmative action/equal opportunity employer.

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VAX/VMS

(PROGRAMMER/SYSTEMS ANALYST)

We have acquired a state-of-the-art relational data base management system implemented in hardware as a back-end processor interfaced to a VAX/VMS host. We are looking for an individual with in-depth experience in the VAX/VMS operating system to provide technical software support services to Programmers, Systems Analysts and Operations personnel. The requirements for this position also includes a Bachelor's Degree in Business Administration, Mathematics, Accounting, Computer Sciences or related fields.

PROGRAMMER/ANALYST

These positions require a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Sciences or related fields. Experience requirements include one year or more of business systems application programming. Heavy COBOL experience on large time sharing system is required.

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Must be a U.S. citizen
Replies held confidential

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Trudie L. Rainey
Employment Section Chief
Reynolds Electrical & Engineering Co., Inc.
Post Office Box 14400
Las Vegas, NV 89114-4400

MIS Professionals

Our three year plan for development of a comprehensive Hospital Information System and a supporting local communication network includes substantial staff increases in Systems Development, Computer Operations, and Systems Programming. That means technical challenge, hard work, and opportunities for our current staff as well as for the Project Leaders we are now recruiting.

General Job Responsibilities

Positions include coordination of in-house personnel with software installation consultants and participation in the conversion from a service bureau to an in-house IBM environment during 1983. All positions will report to the Director, MIS.

General Requirements

IBM experience is mandatory. Previous experience in the health care industry and with the installation of packaged software is preferred. Four to six years data processing experience with a minimum of one year at a senior level.

Project Leaders

Financial Systems

Sr. Systems Analysts with financial systems experience in an on-line environment.

Experience should include multiples of the following systems:

- General Ledger
- Accounts Payable
- Fixed Assets
- Payroll/Personnel
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- Admissions, Discharge, Transfer

Project Leader

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Sr. Systems Programmer with experience in establishing and supporting an IBM Computer Operations environment. Experience with DOS/VSE, CICS, VTAM, VSAM, tape & disk managers, job accounting, and performance tuning.

Please submit your resume and salary history to:

Metropolitan Medical Center



Personnel Department
900 South 8th Street
Minneapolis, MN 55404

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Understanding your DP needs is our first concern!®

A FUTURE WITH SOONER

Sooner Federal in Tulsa is Oklahoma's largest savings & loan. Our growth and future plans have created two outstanding career opportunities for the right candidates with banking and systems management experience.

MANAGER-Retail Banking Systems and Programming and MANAGER-Lending Systems and Programming

Two positions available to manage the systems and programming functions for assigned divisions including systems analysis, programming, testing implementation and user liaison. Must have 3-5 years systems experience in a \$1 billion plus commercial bank, savings and loan, or mortgage banker and 1-2 years in the capacity of systems management. On-line real-time processing with DOS/VSE, CICS and DL/I on a 370 or later computer. Degree required in Computer Science or Accounting. Both positions will report to the Senior Vice-President-Data Processing.

Retail banking position also requires experience in DDA systems and processing. Must be familiar with teller operations, accounting and MIS and CIF systems.

Lending position also requires knowledge in all areas of loan origination and loan servicing functions. Must be familiar with consumer, commercial and construction lending and secondary marketing.

Excellent compensation and benefit package. Please send resume and salary requirements in confidence to:

Jack Koepfink
Vice-President-Personnel
SOONER FEDERAL SAVINGS AND LOAN
P.O. Box 1004
918-663-8251
Tulsa, Oklahoma 74101

SOONER FEDERAL

An Equal Opportunity Employer

DATA PROCESSING



Our user friendly computers need a few friendly users.

You see, we've got this new, ultramodern Data Center in Southern California chock full of user friendly computers. Speaking all the latest languages, they're quite adept at assessing large amounts of information and are just yearning to have some meaningful conversations with you.

So what we'd like to do is this: After reading over the following career

openings, give us a call COLLECT at (213) 980-8568, or if you're in California (800) 232-2020. If our DP Manager thinks you're qualified for one of these positions, we'll set up an interview for you and introduce you to our large IBM mainframe 3032 & 4341 environment.

And, who knows, you just might make a few new friends.

SUPERVISOR-PROJECT APPLICATIONS

Looking for an individual with supervisory experience to be responsible for the Savings area. Qualifications must include proficiency in ASSEMBLER, DOS & CICS.

SYSTEMS ANALYSTS

Looking for individuals with at least 4 years' experience in system analysis and design with automated systems. Strong technical skills which include ASSEMBLER language are required. Must have experience with a financial institution. Strong oral and written communication skills are required. In addition, we have a need for an experienced analyst for our Quality Assurance group. Proficiency in DOS & MVS preferred.

SYSTEMS PROGRAMMER

Looking for an experienced programmer to be part of a conversion project. Strong technical skills which include MVS, JES2, ASSEMBLER and recent DOS VS or VSE experience is required.

PROGRAMMER ANALYSTS

Looking for individuals with a minimum of two years' experience in business applications. Qualifications must include proficiency in ASSEMBLER and DOS or OS. CICS is preferred. Applications which include DDA NOW or commercial lending are desired. In addition, we have a need for a programmer with WANG GENESYS experience.

Gibraltar offers excellent salary and benefits packages including relocation assistance and an **EMPLOYEE HOME LOAN PROGRAM.**

For confidential consideration call, or send resume to:

Human Resources Dept. CW
12012 Chandler Blvd.
North Hollywood, CA 91607

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GIBRALTAR FINANCIAL GROUP



Client companies have immediate needs for experienced D.P. professionals:

Operations Supervisor - 3 years NCR operations exp.
NEAT 3 Programmer - C/P, NCR.
Programmer Analyst - B.S. Computer Science, 3 years COBOL.
IBM Operator - MVS/PMOS VS1
Scientific Programmer-FORTRAN, CDC, DEC, B.S.C.S. degree.
COBOL Programmer-2-4 yrs exp., OS/360, CICS.

Contract position available now thru 1983.

All fees paid. EOE. Relocation package available. Send resume to **SHOW'S RECRUITERS**, 660 N. Central, Anchorage, Alaska 99501.

REGIONAL SALES MANAGERS

New England—Southeast—Midwest

Ground Floor Opportunity in Personal Computer Graphics
Enter Computer, Inc.—manufacturer of the exciting new Sweet-P Personal Plotter—needs three talented regional sales managers with proven skills who can motivate and sell distributors, retailers, and OEM accounts.

Position requires 4 years of related experience in personal computers or computer peripherals. Send your resume with salary requirements to Bob Sherwood, marketing vice-president, Enter Computer, Inc., 6867 Nancy Ridge Drive, San Diego, CA 92121. Tel: 619-450-0601.

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SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems/management company now developing innovative multi-technology systems in Saudi Arabia, has several openings for each of the following challenging positions:

DATA BASE SPECIALISTS

B.S. degree or equivalent. 4-10 years experience in business applications. Understands data base concepts and operations in depth. Working knowledge of structured analysis, design and programming. Knowledge of large scale IBM systems and teleprocessing. Programming ability preferred (COBOL). Team contributor. Supervisory experience required for some positions. Arabic speaking ability an asset.

SYSTEMS ANALYSTS

B.S. degree or equivalent. 6-10 years experience in business applications. Working knowledge of structured analysis and design. Familiar with large-scale IBM systems, OS/JCL, COBOL, and on-line applications. Team contributor. Supervisory experience in equipment configuration desirable. Arabic speaking ability an asset.

COMPUTER OPERATORS

Associate degree required. Minimum 2 years experience in telecommunications network operations. Basic knowledge of modern-to-modern telecommunications protocol and operations. Arabic speaking ability an asset.

SYSTEMS PROGRAMMERS

B.S. degree or equivalent. 3-10 years experience with programming, both applications and systems. Knowledge of CICS, large scale IBM operating systems, and data base management systems. Fluent in COBOL and/or Assembler. Sys. Gen. experience desirable. Knowledge of communications systems desirable. Team contributor. Supervisory experience required for some positions. Arabic speaking ability an asset.

APPLICATION PROGRAMMERS

B.S. degree or equivalent. 4-10 years experience in business applications and large-scale information systems. Fluent in COBOL, IBM OS/JCL, on-line programming. Prefer data base management experience. Knowledge of structured design and programming. Work in high-pressure team environment. Supervisory experience required for some positions. Arabic speaking ability an asset.

We offer an excellent benefit package including: a medical, life, accidental death, disability and profit sharing plan. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal income tax exclusions. U.S. CITIZENSHIP REQUIRED FOR ALL POSITIONS.

Please send resume, INDICATING POSITION TITLE FOR WHICH YOU ARE APPLYING, with present salary to Personnel, SINFOSA, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Avenue, Cupertino, CA 95014. INDIVIDUALS ONLY APPLY.



SYSOREX

Sysorex International Inc.

WANT TO WORK ON THE TECHNICAL FRONTIER AND LIVE IN AN ACADEMIC VILLAGE?

Home in on the cutting edge of nuclear science and technology at one of the largest universities in the country. Enjoy competitive salary, excellent advancement opportunity and fringe benefits (including continuing education) in a beautiful campus community adjacent to the state capital of Michigan. The National Superconducting Cyclotron Laboratory offers you an organization large enough to be a world leader in the study of exotic nuclear phenomena and small enough to know everyone by name. Join a team which will value and reward your ability to solve problems with minimum supervision. Sound interesting?

We're looking for positions as follows:

Programmer/Analyst: Duties are to develop and maintain software for the Laboratory's computer systems. Needs cover a broad range of functions from control of the cyclotron to complex data base management and analysis routines. Minimum qualifications include a demonstrated skill in FORTRAN and MACRO with a basic understanding of digital logic. Knowledge of Digital Equipment PDP/VAX processor desirable.

Send resumes in confidence to Lawrence Tharp, Personnel Administrator, National Superconducting Cyclotron Laboratory, East Lansing, MI 48824-1321.

Michigan State University is an equal opportunity/affirmative action employer.

DP, S&P, TECH SUPPORT MGRS

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(1) Do you have open requisitions that need to be filled?

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(3) Are you frustrated enough to call and listen to our alternative approach to recruiting?

We are J.L. Associates, Inc. and we are the primary recruiters for one of this country's largest companies. We are selectively looking to add a few new clients. We are not your typical recruiter and won't call to solicit your business. We can't afford to waste our time making many cold calls looking for a few good clients. If your answer is "yes" to the above three questions and you want to know more (including client references) call Ken Levinson, (306) 757-8800.

SYSTEMS PROGRAMMER III

Requires a Bachelor's degree in Computer Science or related discipline or equivalent combination of schooling and related work experience. Must have a few years experience in systems programming with demonstrated ability to deal with communication software on existing and future data processing equipment.

Excellent fringe benefits. Interested applicants send resume to Ref. No. 110 stating salary requirements.

THE STATE UNIVERSITY OF NEW JERSEY RUTGERS

Division of Personnel Services
New Brunswick, N.J. 08903

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Equal Opportunity Employer

CONSULTANT

Market professional consulting services. Consult with clients analyzing their needs in a variety of fields, with primary emphasis in the area of economics. Develop multi-dimensional software systems applicable to these fields. Provide professional services in areas relating to statistical analysis, utilizing the following: CLUSTAN, SPSS, SAS and BMDP. Integrate said analysis into recommended strategies and assist top management in implementing these strategies. Requires a M.S. in Computer Science, 2 years academic training in economics and 1 year direct experience. Salary \$30,800/year for a 40 hour week. Send resume to Mrs. Carolyn Korbes Miller, President, Omega Research Consultants, Inc., 1808 West 103rd St., Chicago, IL 60643.

ADMINISTRATIVE APPLICATION ANALYSIS/PROGRAMMER

Minimum of 5 years of administrative data processing with a knowledge of DBMS and COBOL. Experience with Burroughs Cobol and DBMS II, and DEC VAX highly desirable. B.S. degree, or CDP-CCP highly desirable. Duties include working directly with users to implement, modify and maintain the program in systems for their offices.

Salary dependent upon qualifications. Closing date for receipt of application is April 6, 1983. Send resume to:
Richard Cashion
D. W. Matteson Computer Center
Box 5071
Tennessee Technology University
Cookeville, TN 38505
AA/EEEO Employer

PROGRAMMING SYSTEMS

* FORTRAN/PL-1: 1+ yrs exp. DEC equip \$24-42K

* e+, BS/MSCS.

* SYS PROG/CS: BAL, 4341 exp. OS/MVS. Prices: VTAM, CDS

* SOFTWARE ENGR'S: BS/CS/EE. CS, Aero, JTDS exp. 3-8 yrs to \$55K

* COBOL/CICS. OS or DOS any exp. all levels avail. \$24-58K

200+ openings. All fees/expenses fully paid!

Drew Charney 201-342-3300

ACME RECRUITING

214 Main St., Hackensack, N.J. 07601

COMPUTER SCIENCE: Tenure track faculty position beginning Fall 1983. Grand View College needs person to teach course in Computer Science. Masters Degree required. Doctorate preferred. Teaching experience desirable. Instructor or Assistant Professor rank. Salary range \$15-\$20,000 for eight months. Preference given to candidate whose background indicates the person will be comfortable working in a small, private, church-related college setting with an expanding program. Send letter of application and credentials to Dr. Thomas Fletcher, Vice President for Academic Affairs, Grand View College, 1200 Grandview Avenue, Des Moines, Iowa 50316. Deadline April 1, 1983. An equal opportunity employer.



Grass Valley Group

Systems Programmer

This challenging data processing opportunity has been recently created at a Northern California Sierra foothills location.

The position involves the maintenance of DEC VAX/VMS O/S, DECNET, plus H/W and S/W evaluation.

One plus years' systems programming experience and/or a computer science degree considered a plus.

Send resumes to Sylvia Shelton, The Grass Valley Group, Inc., Dept. AA12, P.O. Box 1114, Grass Valley, CA 95945. An equal opportunity employer M/F/H/V.

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Issue Date: Ad closing is every Friday, 10 days prior to issue date.

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Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are \$112.70 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs \$225.40 per insertion. Extra space is available in half-inch increments and costs \$56.35. Box numbers are \$15.00 extra.

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Ad size desired:

_____ columns wide by _____ inches deep.

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Send this form to:
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375 Cochituate Road,
Box 880,
Framingham, MA 01701**

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Senior Systems Software Analyst (CICS)

Centralized data center for large electric utility holding company is seeking a person to be responsible for efficiency and reliability of all CICS systems.

- Install and maintain CICS
- Analyze, design and write system oriented programs
- Involved in area of debugging, tuning, and capacity planning
- Evaluate software and hardware proposals
- Provide formal and informal support to users and EDP operations.

Should have CICS system installation experience.

Mail resume and salary history to Employee Relations Department. Principals only.



Central and South West Corporation

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Equal Opportunity Employer

Systems Software, Hardware and Applications Professionals...

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- High performance Computer System architecture design.
- Develop firmware for Ethernet controller.
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- Design of diagnostics and quality assurance features.
- Develop and evaluate user interface peripherals.
- Development of instrument bus interfaces and co-processing boards.
- Development of large disk interface.
- Selection and interface of peripheral devices.

TECHNICAL WRITERS

- Write service manuals for engineering computing systems and manuals to describe user interface.

MARKETING MANAGEMENT

- **Marketing Manager**
Develop and manage start-up marketing organization.
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Direct the development of marketing strategies for computing system products.

SOFTWARE ENGINEERS

- Develop and integrate advanced Local Area Networking features into UNIX™ kernel.

- Design and develop remote peripheral interfaces and remote file access over LAN.
- Adapt and modify UNIX™ kernel for a microprocessor based system.
- Implement a Basic interpreter, compiler.
- Development of advanced display systems software.
- Develop and integrate an advanced data base management system into a UNIX™ environment.
- Development of real time enhancements for a UNIX™ operating system.
- Develop and maintain test tools for design verification.
- Evaluate, select and implement operating systems and language packages.

TECHNICAL MANAGEMENT

- **Manager, Local Area Networking**
Lead the Software/Hardware development of local area networking subsystems.
- **Manager, Data Base Systems**
Plan, organize, lead and control data base management software group.
- **Manager, Application Software**
Identify, assess and implement a set of general purpose engineering software applications within engineering computing environment.
- **Manager, Advanced Display System and User Interface Development**
Plan, organize and develop advanced bit mapped display systems.

All openings require a technical degree and relevant experience. We can offer compensation that will reflect your education and experience. Subsequent advancement will be based on individual achievement. Benefits include profit sharing and relocation assistance to Portland, a livable city with a mild, four season climate, abundant recreation and a surprisingly affordable cost of living.

For confidential consideration, please send your resume to Professional Staffing, Engineering Computing Systems, P.O. Box 1000, MS 61-195, Wilsonville, Oregon 97070, or call (collect) (503) 685-2524.

We are an equal opportunity employer m/f/h.

TM of Bell Laboratories

Tektronix
COMMITMENT TO EXCELLENCE

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the \$25-35,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.



477 Congress St.
Portland, Maine 04101
(207) 773-4749

FIELD ENGINEERS

Hartford Technical Services is seeking Senior Level 303X, 370, and 4300 X-IBM FE's with openings in Chicago, L.A., Houston, Detroit and Ohio. H.T.S. is a maintenance company that offers substantial savings and service to its maintenance customers. Salary and benefits commensurate with your expertise. If you are seeking a future and have these skills call:

Gerry Darr
(312) 364-0505
Hartford Technical Services, Inc.
515 East Gulf Rd.
Arlington Heights, IL 60005

M.I.S. RECRUITER

We are a Fortune 500 retailer, headquartered in the Sunbelt, with sales in excess of \$1 BILLION. We are seeking an individual with a minimum of 3 years experience in recruiting personnel for the Management Information Systems area of the Company.

The successful candidate will also have a minimum of 2 years "hands on" experience in MIS. Ability to recruit and technically converse with MIS personnel and candidates a must. B.S. degree in Information Systems or Computer Science preferred.

We offer a top salary and outstanding benefits which includes Paid Relocation.

Send your resume with salary history to:

Reply to CW-B4098
Computerworld
Box 880

Framingham, MA 01701

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What's new in data systems in Salt Lake City? It's at American Express.

At the new American Express operations facility in Salt Lake City, you'll find a large-scale IBM environment and opportunities for personal and professional development. Current openings include:

DATA BASE ADMINISTRATION

Your experience should include 2 years MVS-IMS DB/DC in:

- Data Base Design
- IBM Data Dictionary
- Data Base Application Programming and Call Pattern Review.

SR. SOFTWARE PROGRAMMERS

Several positions exist for professionals experienced with large IBM systems (3033, 3081), plus:

- 3-5 years in technical support
- Knowledge of MVS Internals
- SMP, Assembler languages, TSO

APPLICATION PROGRAMMER ANALYSTS

Your 3 years plus experience must emphasize COBOL or Assembler and large IBM systems. IMS, DB/DC background is preferred, with emphasis on structured methodology.

The company that's helping shape the future in processing information is superbly positioned to offer professional challenge and growth. Skiing, hunting, fishing, boating, hiking and much more are all within easy driving distance. Please forward your resume including salary requirements to:

Manager of Employment
American Express Company
Travel Related Services, Inc., Code CW
Salt Lake City, Utah 84184-4700

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SR. SYSTEMS CONSULTANT. Supervise the design & analysis of computer systems for major business clients. Database administration, project leading, analysis & programming. 4 yrs related exp-Systems Analysis/Consulting. B.Sc. or equiv. in Computer Science. Must have knowledge of COBOL, RPG & DL1. \$42,000/yr to work 40 hrs/5 day/wk. Spiridellis & Associates, Inc. 1133 Ave. of the Americas, NY, NY 10036. Pls send resume.



SENIOR PROGRAMMER

Growing Cherry Hill marketing firm is offering excellent opportunity for highly skilled D.P. professional. Qualified candidates should have at least 1 year experience in S/36 RFG III and the ability to design and implement programs independently. If your qualifications match our requirements, we will negotiate salary with experience and offer good company benefits and provide the opportunity for advancement. Please send resume to: Associated Bankcard Holders, P.O. Box 3768, Cherry Hill, N.J. 08034.

Computer Services Marketing Rep

Large full-service mailing company in New York area seeks seasoned, aggressive salesperson (m/f) for computer services division. You will be responsible for marketing direct mail/response programs, data processing, letter shop and printing services for non-profit and commercial accounts. 3-5 years sales experience in mail marketing or direct response. Excellent salary, commission, fringes. Write in full.

Reply to CW-B4106
Computerworld
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Framingham, MA 01701

MUMPS/MIIS PROGRAMMER TRAINER

CompuCare, a leader in health care information systems is seeking a Programmer Trainer to train new hires in MUMPS/MIIS language. Requires excellent oral and written communication skills, poised in speaking before groups and willingness to travel. B.S. in Computer Science and 2 years experience desired. We offer a highly competitive compensation and benefits package to the right candidate. Please send resume and salary history to Director of Personnel.

COMPCARE, INC.
8200 Greensboro Drive
McLean, VA 22102

SYSTEMS PROGRAMMER

If you have at least 4 years experience in data processing, a move to Fisher-Stevens could be the best move of your career.

Your db background should include three years in programming, one year in BAL programming, one year in Operating System programming, and extensive knowledge of IBM equipment and software. A college degree is preferred, but not required. Our equipment includes two IBM 4341's, operating under DOS/VSE. Other software includes CICS, ICSS, and RAMIS/II.

SENIOR PROGRAMMER ANALYST Data Services Division

An outstanding opportunity for the right individual to join a new, rapid-growth division within a large, multi-divisional company, working with on-line systems in a state-of-the-art environment.

Reporting directly to the technical support manager, you will be responsible for spearheading the development of an On-Line Report system for our STARS clients and implementation of this system within the confines of the approved budget and schedule. In addition, you will assist our computer support technicians programmer, and programmer-trainee with technical questions concerning programs, JCL, and all computer software related to our division. Most importantly, you will be responsible for the development of superior management systems.

The qualified candidate must have 3-4 years programming experience in BAL or COBOL plus 2-3 years of analytical background. CICS command level experience a must.

Fisher-Stevens is a large business service organization, providing specialized services to the healthcare, pharmaceutical and related industries. We offer an attractive salary and excellent company benefits, including tuition and dental plan.

If you meet the above criteria, please send resume (MUST include salary requirements) to Francine Cohen, Personnel Manager, FISHER-STEVENS, INC., Dept. CW, Campus Road, Totowa, NJ 07512. Equal opportunity employer M/F/H.



PROGRAMMERS & ANALYSTS

Need a Change in Scenery?

EJR is a dynamic New Jersey based consulting organization providing both management and applications support to Fortune 500 companies in the metro area. Due to expansion, opportunities now exist for experienced data processing professionals in:

- ORLANDO, FLORIDA
- NEW YORK
- NEW JERSEY

Excellent salary and benefits package includes paid overtime, health & life insurance, pension & profit sharing, tuition assistance, in-house education and relocation allowance.

If you have a minimum of 2+ years experience and a desire to work with professionals in state of the art environments, please rush your resume to

JUDYANN AFFRONTI, Manager of Recruitment
or call her COLLECT at (201) 795-3601



COMPUTER ASSOCIATES

5 Marineview Plaza, Hoboken, N.J. 07030

A PLANNED MOVE

is preferable in career growth to just another job change. If you are serious about a position that fits YOUR CAREER objectives, and are well qualified in IDMS or Hardware/Software Sales submit your resume in confidence to:

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(513) 489-7551
(513) 891-0993

PROGRAMMER

Large manufacturing plant in Kansas City area seeking an experienced Programmer. Desired qualifications include Computer Science degree with experience in OS/VS1, CICS command level, PL1 and VSAM. Comprehensive benefits package.

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SYSTEMS PROGRAMMERS IN ALBUQUERQUE

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You'll be joining one of America's largest diversified professional services corporations at an established office slated for exceptional long-term growth. PRC is a corporation of more than 6,000 employees and customer sites across the U.S. and around the world.

These decidedly "upward mobile" positions call for Systems Programmers with at least 3 years' experience and a good working knowledge of ACF/VTAM, ACF/NEP, PEP, TCAM, EP and an understanding of SNA. Familiarity with IBM 3705/3704 is required. Additional experience with at least one of the following is highly desirable: MVS, CICS, VM, VS-1, or Capacity Planning/System Tuning. U.S. citizenship required.

Other opportunities for Systems Programmers in Augusta, GA, and Washington, DC.

For immediate consideration call Jim Aquino at (800) 336-3772, ext. 2223, or forward your resume in confidence to:

prc

Planning Research Corporation

1500 Planning Research Drive, Dept. CW-8
McLean, Virginia 22102

An Equal Opportunity Employer
Principals Only

EDP Professional

Major NYC medical center is expanding its Systems and Programming Department and requires a SENIOR PROGRAMMER/ANALYST to complement its existing staff. Applicants should have extensive experience with IBM DOS/VSE in a 4300 environment, COMMAND or MACRO CICS, VSAM and DL/I. Four to six years experience required, health care background a definite plus. Salary to high \$30's. This position offers an excellent benefits package which includes FOUR WEEKS VACATION, MEDICAL/DENTAL PLANS, AND TUITION REIMBURSEMENT. Interested applicants should send their resumes to:



**BETH ISRAEL
MEDICAL CENTER**

Personnel Department
421 E. 14 St., NYC 10009
An Equal Opportunity Employer

ADABAS/NATURAL Specialist

Fortune 50 corporation located in the Northeast is looking to expand its Data Base technical support staff. Extensive ADABAS/NATURAL experience in an MVS, JES-2, 370-30xx environment a necessity. Must be able to interface with users, as well as application and system programmers. Salary commensurate with experience and qualifications. Send resume to:

**Data Base Administration
CW-B4104, Computerworld
Box 880, Framingham, MA 01701**

An Equal Opportunity Employer

Boston Area

YOUR FUTURE IN MIS...

could lead you to an exciting, high acceleration career with a major corporation active in a wide range of markets.

We're seeking talented, experienced individuals who can step into a dynamic, state-of-the-art environment and immediately start to make things happen.

Senior Systems Analysts low to mid \$30's

These positions require 5-7 years experience plus the ability to assume responsibility for implementation of a major project within a functional area. Duties include systems analysis and design.

Knowledge of data processing, including programming experience, which develops technical expertise and knowledge of business functions, are the major prerequisites of these positions.

Opportunities are available for individuals experienced in the following functional areas:

PAYROLL/HUMAN RESOURCE SYSTEM PROJECT

- Solid experience implementing PR/HRS package.
- Experience dealing with software vendors.
- Experience with a formal, phased systems development methodology.
- Financial applications background.
- Functional payroll or personnel experience desired.

ACCOUNTS PAYABLE AND PURCHASING PROJECT

- Solid experience implementing financial application packages, to include A/P and Purchasing. General Ledger experience a plus.
- Experience dealing with software vendors.
- Experience with a formal, phased systems development methodology.
- Functional accounting/finance experience desired.

Programmer/Analysts low to mid \$20's

Opportunities exist for individuals who possess 2-4 years experience to contribute to the design of systems by writing, testing and debugging programs, setting up JCL procedures and documenting the system for user departments, Systems, and Operations. To develop small to medium size systems, and modifications or enhancements to existing systems, candidates must be capable of analyzing and defining user requirements and formulating solutions.

Knowledge of data processing, including programming experience, which develops technical expertise and knowledge of business functions, are the major prerequisites of these positions.

Positions are available for individuals experienced in the following functional area:

DIRECT ORDER ENTRY:

- Experience in on-line systems using COBOL/CICS, or COBOL/IMS-DC.
- Experience in designing and implementing an on-line order entry system.
- Knowledge of communications/hardware/software alternatives available and utilized in customer computing services.

Interested and qualified candidates should forward resumes, in complete confidence, to CW-B4101, Computerworld, Box 880, Framingham, MA 01701.

An Equal Opportunity Employer M/F

EASTERN & SUNBELT LOCATIONS PROGRAMMERS SYSTEMS ANALYST SOFTWARE ENGINEERS

Are you so busy doing your job that you've forgotten your career? In the rush of today's responsibility, many people are missing tomorrow's opportunities. Invest a few minutes call PAM SPEARS CPC or send a confidential resume. You may find that you qualify for a position in an ideal location with even greater responsibility than you have now. All positions fee paid.

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IN NC (919) 484-4101

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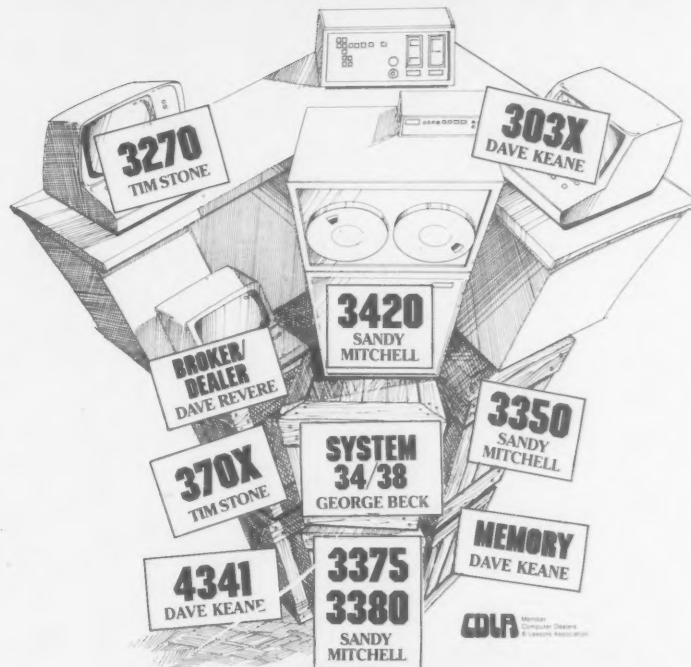
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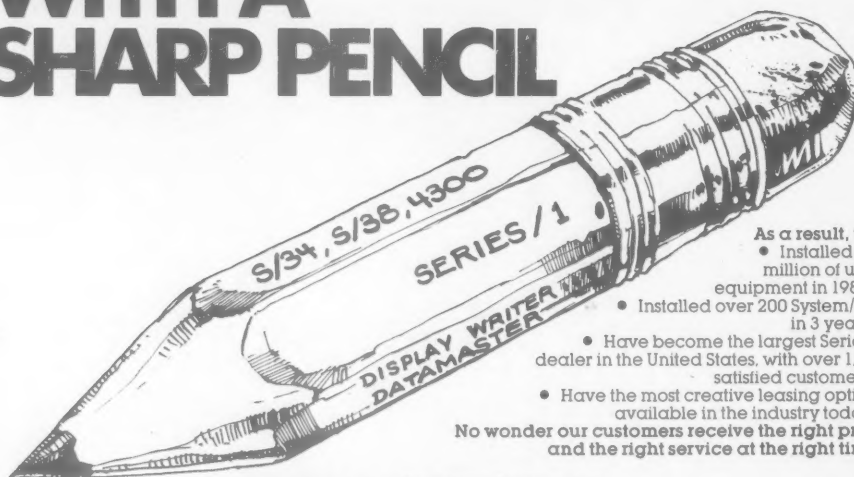
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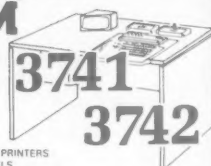
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Proposals are requested for a package covering a prisoner records and accommodation system for institutions operated by the Department of Corrective Services.

A user requirement statement has been prepared in respect of the Department's needs and this statement could be amended to facilitate appropriate packages. (A copy of this statement is available upon request.) Where necessary, Departmental organisational structure could also be modified to accommodate a successful proposal. The proposal should cover a complete software package and include a recommendation for suitable hardware.

It is essential that the proposals be based on existing systems currently operational either within a gaol environment or a similar environment, which could be readily modified to meet the Department's needs.

Interested organisations are invited to discuss the matter further with the Department's Information Services Branch, and appointments can be made with Mr E Manning or Mr R Coote on telephone (Australia) (02) 217 8125.

Proposals should be clearly marked "Proposal for Computerised Records and Accommodation System", and be delivered by 25th March, 1983.

New South Wales Department of Corrective Services, Information Services Branch, Roden Cutler House, 24 Campbell Street, SYDNEY, N.S.W. 2000, AUSTRALIA.
OR: G.P.O. Box 31, SYDNEY, N.S.W. 2001.
Telex: N.S.W. PREM. AA21269
Attention: N.S.W. Dept. Corrective Services

If you require further information in regard to this matter please contact Mr L. Gardner, Administrative Officer, Management Services, on 217 8316 or Mr E. Manning, Information Services Branch, on 217 8125.

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Proposal forms and instructions may be obtained at the office of Mr. J. Laurence Reeves, Program Coordinator, North Shore Community College, 3 Essex Street, Beverly, MA 01915 or by calling (617) 927-4850 ext. 350. Notification of intent to propose must be received by March 25, 1983 at the above address.

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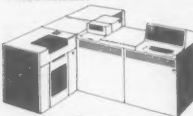
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Paraplot turns statistical data into easy-to-read bars or points. It creates graphs and charts for almost any business activity. In fact, you can produce graphs over 25 inches high. The system plots on your System/34 character printer and CRTs. No special plotting equipment is required. \$350.

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ACCOUNTING SYSTEMS

Para Research offers a series of low-cost interactive accounting systems designed to interface with each other so users will have a completely automated financial/accounting system.

Accounts Payable provides complete control over payables and improves cash management. Accounts Receivable provides up-to-date status of customer records. General Ledger is a highly flexible package for maintaining complete business records. Payroll reduces clerical costs and gives users complete control over payroll processing.

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Documentor, \$600, provides complete automated documentation, with up to fifteen individual reports that describe systems and subsystems in each program. Clock, \$250, an advance job scheduler, allows your System/34 to be productive 24 hours a day. Clock on the System/38 is available for \$500. Rescue, \$250, is a procedure re-start program that can also be used to create duplicate programs and procedures.

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MAPICS Purchasing provides complete tracking status for manufacturers using IBM's MAPICS System. It allows input of multiple vendors per item and interacts with MAPICS Accounts Payable, Inventory Management and Materials Requirements Planning modules. Users can produce reports ranging from Purchase Price Variance to Suggested Order Placement to Cash Requirements. MAPICS Purchasing eliminates key entry and typing of purchase orders. Available on the System/34 for \$1,500.

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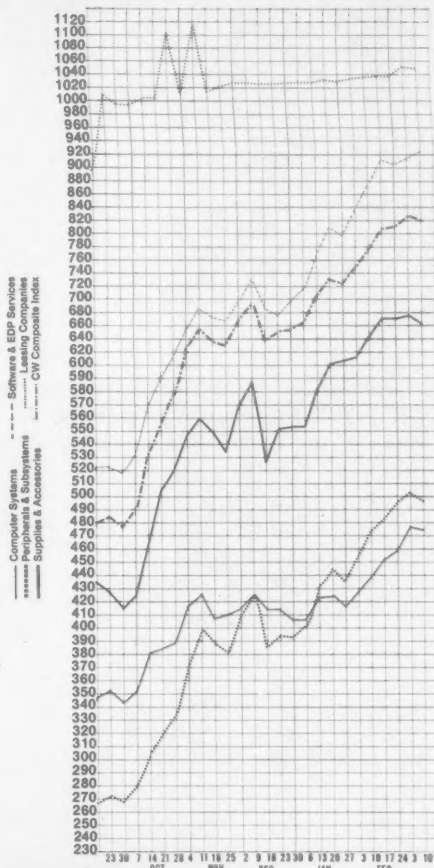
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CLOSING PRICES WEDNESDAY, MARCH 9, 1983

All statistics compiled,
 computed and formatted
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E X C H	RANGE	PRICE				E X C H	RANGE	PRICE				E X C H	RANGE	PRICE			
		1982-83 (1)	CLOSE MAR 9	WEEK NET CHNGE	WEEK PCT CHNGE			1982-83 (1)	CLOSE MAR 9	WEEK NET CHNGE	WEEK PCT CHNGE			1982-83 (1)	CLOSE MAR 9	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS																	
A ANDAHIL CORP	17-44	38 7/8	-2	-4.8	D ADVANCED CORP TECH	1-4	3 3/4	+1/4	+7.1	A COMPUTER CONSOLES	15-44	39 1/8	+1 1/8	+2.9			
N BURROUGHS CORP	28-48	46	+1 5/8	-3.4	D ADVANCED SYSTEMS INC	9-24	22 1/2	-1 1/4	-5.2	D COMPUTER DEVICES INC	4-21	15	-1/8	-2.4			
D COMPUTER AUTOMATION	7-17	15 1/4	+3/8	+2.5	D AUS COMPUTERS INC	7-22	19	-3/4	-3.7	D COMPUTER TRANSDUCER	1-1	1 1/4	+1/4	-3.2			
N CONTROL DATA CORP	21-31	49	-3/4	-1.5	N ANACORP INC	9-22	20 3/4	-1	-4.5	N COMPUTERVISION CORP	19-45	41 1/8	-1/4	-0.6			
N CRAY RESEARCH INC	20-48	42 1/8	-2 3/8	-5.8	D ANALYSTS INTL CORP	5-9	8 3/4	0	0.0	N CONVAR CORP	21-36	32 7/8	+5/8	+1.9			
N DATA GENERAL CORP	20-61	58 1/4	+1 1/4	+2.1	A APPLIED DATA RES.	16-48	47 5/8	+1 7/8	+4.0	D DATA ACCESS SYSTEMS	2-11	10 1/2	+5/8	+6.3			
N DATAPoint CORP	11-36	22 3/4	-1 1/4	-5.2	D ASK COMPUTER SYSTEMS	12-35	28 1/2	-1/4	-0.8	A DATAPRODUCTS CORP	16-41	37 1/2	-1/4	-1.8			
N DIGITAL EQUIPMENT	62-132	130 1/8	+5 7/8	+4.7	B ASTRADYNE CORP IND	1-5	4 1/2	-1/8	-2.7	A DATARAP CORP	5-12	10 3/8	+3/8	+1.2			
A EFTI INC	8-12	11 3/4	0	0.0	N AUTOMATIC DATA PROC	21-40	39	+1 3/4	+4.6	D DATUM INC	2-7	6 1/2	-1/8	-0.0			
N ELECTRONIC ASSOC.	5-12	10	+3/8	+3.8	D CGA COMPUTER ASSOC	5-14	13 1/4	-1/2	-3.6	D DAVID JARISON CARLVY	2-7	7 3/8	-7/8	-18.4			
N FLOATING POINT SYST	18-37	35 1/8	+1 1/8	+0.3	D COMPUTER ASSOC INT'L	12-47	43	-3 1/2	-7.5	D DECISION DATA COMPUT	3-14	12	-3/4	-5.8			
N FORBRO	22-43	37 1/8	-5 3/8	-12.6	D COMPUTER HORIZONS	2-12	14	+4	+80.0	D DELTA DATA SYSTEMS	2-3	3 1/4	-1/8	-2.0			
D FULLCRON CORP GRP	1-3	3 1/4	0	0.0	D COMPUTER NETWORK	4-10	8 1/2	-1/2	-5.5	N ELECTRONIC R & M	5-9	8 1/2	-1/4	-2.8			
N GENERAL AUTOMATION	3-8	6 3/4	+1/2	+6.0	N COMPUTER SCIENCES	11-23	21 3/8	+3/8	+1.7	D EVANS & SUTHERLAND	18-50	41 1/2	-1 3/4	-4.0			
N HARRIS CORP	20-51	45 7/8	-2 3/8	-4.9	D COMPUTER TASK GROUP	8-19	17 3/4	+1 1/2	+9.2	N GENERAL TECHNOLOGIES	1-1	1 1/4	-1/8	-4.5			
N HEMLETT-PARKMAN CO	38-87	81	-4 7/8	-5.6	D COMPUTER USAGE	2-22	20 3/4	+5 1/2	+36.0	N GEN'L DATA CORP IND	6-19	17 5/8	-1/2	-2.7			
N HONEYWELL INC	60-104	94 3/8	-3 3/4	-3.8	D COMPUTONE SYSTEMS	15-38	30 3/4	-2 1/2	-7.5	D GENERAL TERMINAL CP	0-2	7/8	-	-6.2			
N IBM	57-103	102 1/4	+1/8	+0.1	D CONSERV CORP	11-20	17 1/4	-3/4	-4.1	D GREAT SOUTHERN IND	2-6	2 1/2	0	0.0			
D IFL SYSTEMS INC	5-11	8 3/4	-1 1/4	-12.5	D CONSHARE	6-13	12 7/8	+1/2	+4.0	N HAZELTINE CORP	22-58	56 5/8	-7/8	-2.7			
D INNOVATION CORP SYST	2-5	3	0	0.0	N CULLINET SOFTWARE	12-35	33	+2	+6.4	D ICGT CORP	3-10	7 1/8	+1 5/8	+1.6			
N MANAGEMENT ASSIST	7-18	14 5/8	+1 1/2	-9.3	D CYCARE SYSTEMS INC	9-16	16 1/2	+3/4	+4.7	D INFORMATION INTL INC	10-22	20 1/4	+1	+5.1			
D MINI-COMPUTER SYST	1-2	5/8	0	0.0	D DATA DIMENSIONS INC	1-2	1 1/4	0	0.0	D INTEL CORP	21-47	43 1/4	-1 3/4	-3.8			
N MODULAR COMPUTER SYS	8-15	12	-1 7/8	-13.5	D DATATIME	0-2	3/4	0	0.0	D INTEL SYSTEMS INC	1-2	3/4	-1/8	-3.0			
N NORDMAN DATA SCI	10-19	18	-1 1/8	-6.5	D DATATRON CORP	2-4	3 1/2	-1/4	-8.8	A LUNDI ELECTRONICS	7-16	14 1/2	0	0.0			
N NCR	39-108	103 3/4	-3	-2.8	N ELECTRONIC DATA SYST	19-56	56	+2 3/4	+5.1	D MBI DATA CORP	14-36	18 5/8	-1 1/8	-5.6			
N PERKIN-ELMER	17-33	30 1/2	+3/8	+2.0	N INFORMATICS INC	10-28	27 1/4	+1/2	+1.8	D NETWORK SYSTEMS CORP	15-43	39 1/8	-1/8	-6.8			
N PRIME COMPUTER INC	16-45	41 7/8	-2 3/8	-5.3	D INSYTE CORP	1-3	1 7/8	-1/8	-8.2	D OHEX	3-5	3 1/2	0	0.0			
N SPERRY CORP	14-24	35 5/8	0	0.0	D JPS COMPUTER MARKET	1-2	1 1/8	0	0.0	N PARADYNE CORP	24-51	46 1/4	0	0.0			
N TANDEN COMPUTERS INC	14-24	27 3/8	+2 1/4	+9.8	D KEANE ASSOCIATES	4-8	7 1/2	-1/4	-5.8	D RENTEL CORP	13-58	57 1/2	+1 1/8	+8.0			
N TEXAS INSTRUMENTS	71-176	159 1/8	+3 5/8	+2.3	A LOGICON	12-34	34 1/4	+2 1/4	+7.0	D RAMTER CORP	12-26	23 1/2	-1/4	-5.0			
A WANG LABS "B"	13-37	33 1/4	-1 1/2	-4.3	D MGT SCI AMER INC	8-38	23	-2 1/2	-9.8	N RECOGNITION EQUIP	4-13	10 3/4	-1/8	-0.0			
A WANG LABS "C"	11-37	33 1/2	-1 3/8	-3.9	D MATHEMATICA INC	12-22	19 3/4	+1/2	+2.3	N RESEARCH CORP	1-1	1 1/2	-1/8	-2.5			
LEASING COMPANIES																	
D BOOTH FINANCIAL CP	22-38	32 1/4	-1 1/2	-4.4	D MATHEMATICAL APP GRP	12-22	21 1/2	+1/2	+2.3	N STORAGE TECHNOLOGY	16-33	23 5/8	0	0.0			
N COMSICO INC	7-28	26 1/4	+3/8	+1.4	D NATIONAL DATA CORP	5-24	21 1/4	-1 1/8	-5.0	D SYKES DATATRONICS	6-27	8 1/8	+1 1/4	+12.3			
D CUMMERCIAL GROUP CORP	1-1	1 1/4	0	0.0	D PANORPHE SYSTEMS	8-25	23 5/8	-1 1/2	-5.8	I T BAR INC	7-14	12 1/4	+1 3/8	+12.6			
D COMPUTER INVTSTRS GRP	1-2	1 1/2	0	0.0	N PLANNING RESEARCH	8-18	15	+1/8	+0.8	D TEC INC	6-12	8 1/2	-1/2	-5.5			
D CONFIDENTIAL INFO SYS	5-21	19 1/2	-2 1/4	-11.2	D PROGRAMMING & SYS	1-4	3 3/8	0	0.0	N TEKTRONIX INC	34-75	70 5/8	-4 3/8	-18.0			
N DVP INC	5-14	12 3/8	-7/8	-6.6	D REYNOLDS & REYNOLD	17-38	37 1/2	-3/4	-1.9	D TELUX	3-2	20	0	0.0			
D ITEL	1-3	3 1/4	0	0.0	D SEI CORP	11-25	23 1/2	-1/2	-2.0	D TESSATA SYSTEMS CP	3-2	10 3/8	-3/8	-2.8			
D LEASCAP CORP	1-2	1 1/8	0	0.0	D SHARED MEDICAL SYST	13-38	32 1/2	-3 3/4	-10.3	N TIMEPLEX INC	7-24	18 1/8	-1 1/8	-5.8			
N U.S. LEASING	18-41	40 1/8	+1/2	+1.2	D SCIENTIFIC COMPUTERS	6-13	12 1/2	+3/4	+6.3	D VISUAL TECHNOLOGY	9-20	19 3/4	+1/4	+1.2			
SOFTWARE & EDP SERVICES																	
D ADVANCED CORP TECH	1-4	3 3/4	+1/4	+7.1	D SOFTWARE AG	9-17	10 1/4	-1/2	-4.8	D WILTEX INC	1-3	2 7/8	+1/4	+9.5			
D ADVANCED SYSTEMS INC	9-24	22 1/2	-1 1/4	-5.2	N TYNSHARE INC	12-30	23 3/4	-1 1/8	-5.3								
D AUS COMPUTERS INC	7-22	19	-3/4	-3.7	A URS CORP	5-14	14 1/4	+1 3/4	+14.0								
N ANACORP INC	9-22	20 3/4	-1	-4.5	N WYLY CORP	7-13	12 3/8	+1 1/2	+13.7								
D ANALYSTS INTL CORP	5-9	8 3/4	0	0.0													
A APPLIED DATA RES.	16-48	47 5/8	+1 7/8	+4.0													
D ASK COMPUTER SYSTEMS	12-35	28 1/2	-1/4	-0.8													
B ASTRADYNE CORP IND	1-5	4 1/2	-1/8	-2.7													
N AUTOMATIC DATA PROC	21-40	39	+1 3/4	+4.6													
D CGA COMPUTER ASSOC	5-14	13 1/4	-1/2	-3.6													
D COMPUTER ASSOC INT'L	12-47	43	-3 1/2	-7.5													
D COMPUTER HORIZONS	2-12	14	+4	+80.0													
D COMPUTER NETWORK	4-10	8 1/2	-1/2	-5.5													
N COMPUTER SCIENCES	11-23	21 3/8	+3/8	+1.7													
D COMPUTER TASK GROUP	8-19	17 3/4	+1 1/2	+9.2													
D COMPUTER USAGE	2-22	20 3/4	+5 1/2	+36.0													
D COMPUTONE SYSTEMS	15-38	30 3/4	-2 1/2	-7.5													
D CONSERV CORP	11-20	17 1/4	-3/4	-4.1													
D CONSHARE	6-13	12 7/8	+1/2	+4.0													
N CULLINET SOFTWARE	12-35	33	+2	+6.4													
D CYCARE SYSTEMS INC	9-16	16 1/2	+3/4	+4.7													
D DATA DIMENSIONS INC	1-2	1 1/4	0	0.0													
D DATATIME	0-2	3/4	0	0.0													
D DATATRON CORP	2-4	3 1/2	-1/4	-8.8													
N ELECTRONIC DATA SYST	19-56	56	+2 3/4	+5.1													
N INFORMATICS INC	10-28	27 1/4	+1/2	+1.8													
D INSYTE CORP	1-3	1 7/8	-1/8	-8.2													
D JPS COMPUTER MARKET	1-2	1 1/8	0	0.0													
D KEANE ASSOCIATES	4-8	7 1/2	-1/4	-5.8													
A LOGICON	12-34	34 1/4	+2 1/4	+7.0													
D MGT SCI AMER INC	8-38	23	-2 1/2	-9.8													
D MATHEMATICA INC	12-22	19 3/4	+1/2	+2.3													
D MATHEMATICAL APP GRP	12-22	21 1/2	+1/2	+2.3													
D NATIONAL DATA CORP	5-24	21 1/4	-1 1/8	-5.0													
D PANORPHE SYSTEMS	8-25	23 5/8	-1 1/2	-5.8													
N PLANNING RESEARCH	8-18	15	+1/8	+0.8													
D PROGRAMMING & SYS	1-4	3 3/8	0	0.0													
D REYNOLDS & REYNOLD	17-38	37 1/2	-3/4	-1.9													
D SEI CORP	11-25	23 1/2	-1/2	-2.0													
D SHARED MEDICAL SYST	13-38	32 1/2	-3 3/4	-10.3													
D SCIENTIFIC COMPUTERS	6-13	12 1/2	+3/4	+6.3													
D SOFTWARE AG	9-17	10 1/4	-1/2	-4.8													
N TYNSHARE INC	12-30	23 3/4	-1 1/8	-5.3													
A URS CORP	5-14	14 1/4	+1 3/4	+14.0													
N WYLY CORP	7-13	12 3/8	+1 1/2	+13.7													
PERIPHERALS & SUBSYSTEMS																	
P AM INTERNATIONAL	2-4	3 5/8	-1/8	-3.3	N AMERICAN BUS PRODS	11-22	21 5/8	+1/4	+1.1								
A ANDERSON JACOBSON	8-28	19	-1	-5.0	D BALTIMORE BUS FORMS	1-2	1	0	0.0								
D AUTO-TROL TECHNOLOGY	8-21	17	-1 1/4	-8.8	N BARRY WRIGHT	13-25	24 1/4	+3/4	+3.1								
BANCTEC INC	7-39	18	-1	-5.8	D CYBERNETICS INC	1-1	1 3/8	0	0.0								
A BEEHIVE INT'L	4-11	11 1/4	+2	+21.8	A DUPLEX PRODUCTS INC	12-21	20	-2 1/8	-11.8								
A BOLT-BERANEK & NEW	13-40	38 3/4	-1 1/2	-3.9	N ENNIS BUS. FORMS	16-30	28 1/2	+1/4	+0.8								
D CANEX CORP	2-4	2 1/8	-1/8	-5.3	N JENI CORP	48-82	80	-1/8	-0.1								
N CENTRONICS DATA CORP	8-20	18 1/2	+1/2	+2.8	N MOORE CORP LTD	26-48	45 1/4	-3/4	-1.6								
A CETEC CORP	4-9	8	+1/4	+3.2	N NASHUA CORP	9-19	14 1/8	+3/8	+2.7								
D COGNITRONICS	2-14	13 1/8	+2 1/4	+20.8	D STANDARD REGISTER	32-88	93	-2 1/2	-2.8								
D COMPUTER COMMUN.	1-2	1 3/8	0	0.0	A TAB PRODUCTS CO	11-23	21 1/2	-1/2	-2.3								
SUPPLIES & ACCESSORIES																	
N AMERICAN BUS PRODS	11-22	21 5/8	+1/4	+1.1	N WALLACE BUS FORMS	22-56	54 5/8	-5/8	-1.1								
D BALTIMORE BUS FORMS	1-2	1	0	0.0													
N BARRY WRIGHT	13-25	24 1/4	+3/4	+3.1													
D CYBERNETICS INC	1-1	1 3/8	0	0.0													
A DUPLEX PRODUCTS INC	12-21	20	-2 1/8	-11.8													
N ENNIS BUS. FORMS	16-30	28 1/2	+1/4	+0.8													
N JENI CORP	48-82	80	-1/8	-0.1													
N MOORE CORP LTD	26-48	45 1/4	-3/4	-1.6													
N NASHUA CORP	9-19	14 1/8	+3/8	+2.7													
D STANDARD REGISTER	32-88	93	-2 1/2	-2.8													
A TAB PRODUCTS CO	11-23	21 1/2	-1/2	-2.3													
N WALLACE BUS FORMS	22-56	54 5/8	-5/8	-1.1													

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=LOANED; F=FOREIGN; D=OVER-THE-COUNTER
D-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

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